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Essays on Banking: Various Aspects of the Interaction between a Firm and its Creditor Banks.

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To my family, with love

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CONTENTS

INTRODUCTION

The thesis is composed of three chapters on topics related to banking. The first chapter studies the impact of emotions on real-world decisions made by loan officers by analyzing the loan conditions of loans granted immediately after a bank branch robbery. We find significant differences in conditions of the loans granted after a robbery (compared to changes in loan conditions that occur contemporaneously at unaffected branches) suggesting that loan officers do change their decisions following this event. In general loan officers seem to adopt so-called avoidance behavior: they decrease at once the likelihood of having contact with the client by lengthening the maturity of the loan contract and by demanding more collateral thereby reducing the probability of loan non-performance (and dealings with the client) prior to maturity. Loan officers also end up granting loans with somewhat softer loan conditions. Further in accordance with the literature on posttraumatic stress we find that the avoidance behavior that manifests itself in loan conditions is halved within two weeks after the robbery and that the effect further varies depending on the presence of a firearm during the robbery.

The second chapter analyses the repayment decisions of firms with multiple loans that, for liquidity constraints or strategic reasons, stop making payments in some but not all their loans. Using a sample of commercial loans from Colombia over the period 2002:03 – 2012:06, I find that firms are less likely to delinquent on loans granted by banks with which they have long relationships and by banks with which they have a clean repayment history. These results suggest that firms are concerned with losing the benefits gained through the relationship and that they anticipate that banks will punish more the delinquencies made to their own loan portfolio than to the one of their peers. I also find that firms are more likely to delinquent on loans granted by foreign and by public banks and on loans that are more likely to end up in a

renegotiation process. This suggests that the ability and willingness of the bank to punish the firm for misbehaving play an important role on firm's decision. Overall, the results suggest that firms assess the influence of their delinquency choices on their ability to obtain new loans in the future.

The third chapter analyses the causal link between the length of the credit bureaus retention time and the subsequent behavior by lenders and borrowers. It exploits a quasi-experimental variation in retention times, provided by the introduction of the Habeas Data law in Colombia. The law was ratified in 2009 and prohibited institutions in Colombia to access the entire credit history of borrowers. Since then, the negative credit information is observable only for a period that depends on the length of the delinquency period. Our results, suggest that after the introduction of the Habeas Data law: i) the duration of loan delinquency periods are longer, ii) firms seem to strategically wait long enough, until their negative records disappear from the credit bureaus, before switching banks, iii) banks grant loans with higher interest rates and lower collateral requirements.

Fear, Anger and Credit.
On Bank Robberies and Loan Conditions

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Fear, Anger and Credit.

On Bank Robberies and Loan Conditions

Abstract

We study the impact of emotions on real-world decisions made by loan officers by analyzing the loan conditions of loans granted immediately after a bank branch robbery. We find significant differences in conditions of the loans granted after a robbery compared to changes in loan conditions that occur contemporaneously at unaffected branches. In general loan officers seem to adopt so-called avoidance behaviour. In accordance with the literature on posttraumatic stress their avoidance behavior is halved within two weeks after the robbery and the effect further varies depending on the presence of a firearm during the robbery.

JEL Codes: G02, G2.

Key words: behavioural finance, bank robberies, transactional versus relationship lending.

I. INTRODUCTION

During the last few decades, there has been a growing interest in understanding the role emotions play in judgment and choice. Research in the cognitive sciences have found that both immediate emotions (experienced at the time of the decision that might arise from factors unrelated to it) and expected emotions (predictions about the emotional responses to decision outcomes) may play an important role in the decision making process (Loewenstein (2000), Lerner and Keltner (2001), Lowenstein and Lerner (2003)). Recent research in financial economics has naturally focused on the central role emotions play in traders' decision making (Lo and Repin (2002), Lo, Repin and Steenbarger (2005), Fenton-O'Creevy, Soane, Nicholson and Willman (2011)). The main emotions experienced by traders are greed and fear, and they appear as a result of previous successes or failures in the market. Learning strategies for emotion regulation seem indeed to have important consequences for trader behavior and performance. According to Fenton-O'Creevy, Soane, Nicholson and Willman (2011) for example high performance traders are more inclined to regulate emotions and to cope with negative feelings. By contrast, low performance traders engage in avoidant behaviors or invest substantial cognitive effort in modulating their emotional responses.[1]

Besides traders, there is an important class of individuals that take important financial decisions on a daily basis, yet that have hardly been analyzed, i.e., the loan

[1] See also Guiso, Sapienza and Zingales (2014) on the emotional response by Italian investors triggered by the financial crisis, Pool, Stoffman, Yonker and Zhang (2014) on the effects of shocks (due to a decline in house prices) to mutual fund managers' personal wealth on their professional risk taking, and Cohn, Engelmann, Fehr and Maréchal (2015) on experiments in which financial professionals primed with a financial bust were found to be substantially more fearful and risk averse than those primed with a boom.

officers at bank branches. These are individuals that around the world are in charge of key decisions related to the process of granting loans. They evaluate, authorize, recommend approval and/or define the loan terms of the new loans. They base their decisions on a set of rules imposed by the bank, as well as on their own perception of the loan applicant. This perception, however, is influenced by loan officers' experience, education, ethnicity, social background and to a large extent the emotions experienced at the time they analyze the loan application.

Although there has been a lot of research on the determinants of lenders' judgment, discretion, and choices, including tastes, going back to at least Becker (1957), the role of loan officers' emotions have been largely ignored. This may be attributed to a lack of data and, in particular, the difficulty of finding the right setting that allows isolating the effect of emotions on credit outcomes in particular loan terms.

In this paper, we study the impact of emotions on real-world decisions made by loan officers. We do so by analyzing the conditions of loans granted immediately after an exogenous event that directly affected the emotions of the loan officers.[2] The exogenous events we focus on are bank branch robberies. Such robberies provide for "reasonable quasi-natural experiments". Robberies are notoriously difficult to predict, with respect to the exact branch and time where the action will take place, and bank robberies are likely emotionally charged because these events are almost always characterized by the threat and/or the actual use of violence. As a consequence loan officers often experience several posttraumatic stress symptoms after a robbery: Increased awareness of surroundings, sleep disturbance, nightmares, difficulty

[2] Other work analyzes loan approvals and outcomes around emotional events that are aggregate and/or anticipated. Agarwal, Duchin, Evanoff and Sosyura (2013) for example analyze the impact on loan approval of nation-wide events such as the Super Bowl and the American Idol contest, and days around major holidays. Similarly, Baele, Farooq and Ongena (2014) analyze loan performance during Ramadan in Pakistan.

concentrating, avoidance, anxiety, irritability and outbursts of anger are among the symptoms encountered (Leymann (1988), Kamphuis and Emmelkamp (1998), Miller-Burke, Attridge and Fass (1999)). The symptoms are commonly experienced immediately after the robbery, however they are found to diminish rapidly within the first week after the incident and only few if any of the symptoms remain six months later (Leymann (1988)).[3] Consequently, the impact of bank robberies on loan terms should be reduced over time.

Moreover, the severity of the consequences experienced by loan officers is influenced by the intensity of the bank robbery. Miller-Burke, Attridge and Fass (1999) for example found that the use of weapons by the assailants is associated with the loan officers experiencing more symptoms of posttraumatic stress, i.e., higher perceived stress, worse physical health, and worse work productivity after the robbery. We therefore expect to find a stronger effect on the loan conditions granted by branches that experience a more violent robbery. In sum, robberies yield almost perfectly exogenous but temporary shocks of varying strength to the emotional state of mind of the loan officers affected by the robbery which allows us to identify how emotions determine loan conditions.

To accomplish this analysis we therefore combine two unique datasets. We first access unique data collected by the *Policía Nacional de Colombia*, the Colombian National Police, which contains detailed information on 389 bank robberies that took place in Colombia between 1998 and 2011. In particular we will employ the address of the robbed branch, the exact date of the robbery, the amount robbed, the weapon

[3] Interestingly, robbery witnesses remember long and accurately many details about the robbery (e.g., action, weapon, clothing), but in contrast to other stressful events there may not be a significant relationship between the degree of emotion involved and the number of details remembered (Christianson and Hübinette (1993)).

used and the type of robbery. Matched with the robbery data, we use information on commercial loans reported by financial institutions to the *Superintendencia Financiera de Colombia*, the regulator of Colombia`s financial system. Detailed information on the loan conditions, i.e., maturity, collateral, interest rate, and loan amount, the loan rating and the date of origination of the loan is provided for all the commercial loans granted between 1998 and 2010.

We employ a difference in difference approach to measure what effect a bank robbery has on loan conditions. The treatment group for each event corresponds to the loans granted locally by the bank whose branch was robbed, and the control group corresponds to the loans that were granted by all banks in the rest of the country. In order to rule out structural changes in the process of granting loans (due to for example monetary policy changes or internal organizational changes), we define an event window for each bank robbery that retains only those loans granted 90 days before and 90 days after the bank robbery. In addition, we include a set of branch-event fixed effects in order to account for any observable and unobservable branch specific heterogeneity across time.

We find significant differences in conditions of the loans granted after a robbery suggesting that loan officers do change their decisions following this event. In general loan officers seem to adopt so-called avoidance behavior: They decrease at once the likelihood of having contact with the client by lengthening the maturity of the loan contract and by demanding more collateral thereby reducing the probability of loan non-performance (and dealings with the client) prior to maturity. These effects are also economically meaningful. Maturity increases by 3.3 months, for an average maturity of 8.7 months, while the likelihood collateral is pledged increases by 3.4 percentage points (pp), for a mean likelihood that equals 18.4 percent, and

collateralization (i.e., collateral over loan amount) increases by 3.9 pp, for an average collateralization of 15.4 percent. However, as the symptoms experienced by the loan officer likely wear off quickly (or so the literature on posttraumatic stress suggest), the effect on these loan conditions should commensurately dissipate. And indeed we find that the avoidance behavior that manifests itself in maturity, collateral and collateralization is halved within two weeks after the robbery.

Further consistent with avoidance behavior is our finding that loan officers end up granting loans with *ceteris paribus* slightly softer loan conditions, possibly reflecting a reduced willingness to spend face-to-face bargaining time with applicants (Mosk (2013)). Loans at once carry a somewhat lower interest rate and a higher loan amount: The interest rate drops by 30 basis points (bps), for a mean interest rate of 17.2 percent, and the loan amount increases by 34 Million COP, for a mean loan amount of 928 million COP. Finally, we find that loans granted after a robbery are more likely to be non-performing, indicating the relevance of our findings concerning loan officers` emotions for optimal credit allocation by banks in the economy.

But the effect further varies depending on the presence of a firearm during the robbery. In robberies where the perpetrator carries a firearm, loan officers subsequently adopt stricter avoidance behavior, with longer maturity and higher collateral requirements, and the correspondent lower loan rates and higher loan amounts. But in those robberies where there was no firearm involved, collateral requirements and loan amount initially drop while loan rates increase.

That the results differ according to the presence of a firearm during the robbery is interesting and fully consistent with the idea that different emotions may be triggered depending on the severity of the robbery. When the robber has a firearm loan officers are likely to feel overpowered and threatened, so fear and afterwards depressed

resignation will most likely be the emotions that prevail. On the other hand, loan officers that are present in robberies without any firearms involved are possibly less terrified during the ordeal and angry afterwards. They could feel anger because their space and security has been violated, yet they were not able or courageous enough to prevent the incident. In line with this reasoning Lerner and Keltner (2001) find that fear and anger have opposite effects on risk perception for example. Whereas fearful individuals made pessimistic risk-avoidance choices, angry individuals made tough risk-seeking choices.

We enrich the interpretation of our findings further by studying robbers` re-visitations of branches and the differentiated impact by branch size, bank type, firm and loan size, and bank-firm relationship length.[4] Finally, we investigate potential alternative explanations, including the accumulation of work, changes in bank policies and customer reactions, but find these to be rather inconsistent with our estimates.

Given this unique setting our paper helps distinguish between competing theories about the effect of life-threatening events on human behavior. Bernile, Bhagwat and Rau (2016) for example document a non-monotonic relation between the intensity of CEOs' early-life exposure to fatal disasters and corporate risk-taking (see also e.g., Malmendier and Nagel (2011), Oswald, Proto and Sgroi (2012), Kim and Lee (2014), Cameron and Shah (2015), Dessaint and Matray (2015)). In contrast to these papers that study the potential long run effects of life-threatening events for general

[4] Based on one of the authors` own experiences working in the financial sector in Colombia, and not unlike is the case in many other countries, we know that loan officers in branches can and will exert discretion in setting loan terms, especially when located in smaller branches (in the province) in domestic banks and for smaller loans to smaller firms that are relationship customers.

managerial actions, we can assuredly identify the *immediate* impact on *specific* terms of loans granted by loan officers following bank branch robberies.

The rest of the paper proceeds as follows. Section II provides a review of the related empirical literature. Section III describes our identification strategy. Section IV introduces the econometric methodology used in our analysis. Section V describes the data and provides descriptive statistics. Section VI contains the empirical results, including tests for robustness and an assessment of potential alternative explanations. Conclusions follow in Section VII.

II. LITERATURE

A large literature discusses the role played by emotions in labor and organizations (Mumby and Putnam (1992), Martin, Knopoff and Beckman (1998)), and also in expert decision-making (Lowenstein and Lerner (2003)). Most of the evidence on the role played by emotions is collected in experimental settings or from surveys. One recent notable exception is Danziger, Lev and Avnaim-Pesso (2011). They show that taking their food break, and consequently recuperating from possible mental depletion, led eight Israeli judges that were followed in 1,112 parole cases over a ten-month period to rule more favorably; favorable rulings dropped from 65 to almost zero percent in the run up towards one of their two daily food breaks, to jump back up to 65 percent immediately thereafter.

At the same time a recent empirical literature has commenced to study more closely the decision-making of another important group of expert professionals, i.e., loan

officers.[5] These are individuals that work for a bank and that handle applications for credit made by firms and households to the bank. Loan officers typically have decision power, either as individuals or in a committee (for large loans for example), and even when assisted by expert software (that generates an internal credit score on a borrower for example) loan officers often can - within certain limits - overrule its outcomes.

Recent empirical work has documented the determinants of the discretion loan officers wield in their credit decisions (Cerqueiro, Degryse and Ongena (2011), Degryse, Liberti, Mosk and Ongena (2011), Puri, Rocholl and Steffen (2011)), the impact on their decisions of delegation (Liberti (2004)) and pay (Agarwal and Ben-David (2012), Brown, Westerfeld, Schaller and Heusler (2012)), their willingness to game the expert software (Berg, Puri and Rocholl (2013)), and their apparent use of discretion to discriminate (taste-based *à la* Becker (1957)) on the basis of the gender or race of the potential borrowers (Ravina (2009), Hertz (2011), Ongena and Popov (2015)), Bellucci, Borisov and Zazzaro (2010); also Beck, Behr and Guettler (2012)).

Yet, as far as we are aware, there is little or no evidence on the role played by emotions in the decision-making by loan officers, and the range over which emotions determine actual real-world credit outcomes. Yet, at the same time anecdotal evidence and interviews with loan officers indicate that emotions - emotionally laden intuitions, i.e., "gut feelings", in particular - may play a crucial role in credit decisions (see also for example the structured interviews with fourteen loan officers at one bank in Israel in Lipshitz and Shulimovitz (2007)).

[5] A normative literature which can be found in any banking textbook has discussed the inputs into the decision-making process (the five Cs for example, i.e., Character, Capacity, Capital, Collateral, and Conditions), the decision process, and the required characteristics of the loan officer him or herself.

While emotions themselves can be negative or positive, all types of emotions traditionally were considered to have a negative effect on the decision quality (or rationality), and were therefore typically described as "disruptive," "illogical," "biased," and "weak" (Putnam and Mumby (1993), p. 36). This is no longer the perspective the current literature has, however, and the impact of each particular emotion has to be studied in detail to assess its outcome on the decision that is being taken.

Important for our study in this regard is a recent set of experiments by Raghunathan and Tuan Pham (1999). They start from the observation that many important decisions are made under emotionally-taxing conditions. They therefore focus on the influence of negative emotions at the time of decision-making. They predict, and experimentally confirm, that in trade-offs between risk and return the negative emotion of anxiety in particular will bias the preferences of the decision-maker towards low-risk low-return outcomes, even if the decision-to-be-taken is partly or completely unrelated to the anxiety-producing event. Why is that?

First, Raghunathan and Tuan Pham (1999) posit that negative emotions may shape people's decisions by skewing the content of their thoughts. "It is well established that under negative mood people's perceptions, thoughts, and judgments are often distorted toward greater negativity - an effect known as mood congruency." Relevant in this regard is also a study by White, McManus and Ehlers (2008) who show that prior to treatment of a posttraumatic stress disorder, patients overestimated the probability and the cost of all types of traumatic events occurring relative to non-patients, and they overestimated the probability and cost of the specific type of traumatic event that they had been traumatized by. These judgment biases were specific to traumatic events and did not generalize to all negative events.

Second, Raghunathan and Tuan Pham (1999) argue that negative emotions may shape decision makers' motives and in that way determine decisions. A pervasive motivational shift observed under negative emotions is an intensified concern "for elevating or 'repairing' one's mood". The meaning structure underlying anxiety, they argue, is defined by high uncertainty over an outcome and low control over a situation, which results in an implicit goal of uncertainty reduction by the decision-maker. Finally, Raghunathan and Tuan Pham (1999) argue that negative emotions may alter the process through which people make decisions. Anxiety may interfere with the decision-maker's ability to process information. As a result, anxious individuals are posited to process information less systematically.

To study the impact of anxiety on real-world decisions made by loan officers we investigate the loan conditions of granted loans in the period immediately following the robbery of a bank branch when branch employees may suffer from PTSD.

III. IDENTIFICATION STRATEGY

1. Robberies of a Bank Branch

Robberies of bank branches provide for "acceptable" quasi-natural experiments. Even though the robbery itself may be the outcome of an economic decision-making process followed by the robber(s) (Ozenne (1974)), robberies are actually quite rare in many countries. Many bank branches will not experience a robbery for a long time period, if ever. During our eight-year sample period, i.e., 2003:01 - 2011:12, for which we obtain data from the *National Police of Colombia*, 835 bank robberies took place in. During this time period they were around 4,250 bank branches in Colombia resulting in an average yearly hazard rate at the branch level of 2.2 percent. Compared

to other crimes, bank robberies are fairly uncommon (Lamm Weisel (2007)) and always create a bit of a local "event".[6] If anything, robberies have become even rarer over time (O'Flaherty (2009)) in many countries, also in Colombia. The hazard rate at the branch level in our sample drops from 4.2 percent in 2003 to 1.7 percent in 2011.

Robberies are notoriously difficult to predict, with respect to precisely where (branch) and especially exactly when (day and time) they will take place. Surprise is an essential ingredient in any robbery otherwise the police could just sit, wait and arrest the potential perpetrator(s).[7]

a. Location

While the exact branch and time where a robbery will take place is difficult to predict, higher unemployment or fewer policemen per capita not surprisingly spur more robbing across U.S. States (Samavati (2006)), and so does branch location in or close to a low-income area (Hannan (1982)),[8] i.e., proximity to potential offenders is a key factor in helping to predict branch robberies (Baumer and Carrington (1986)). Easy access to a highway or an arterial route (to get away) and distance from a police station (Baumer and Carrington (1986)) may also play a role.

At the branch level there are also certain characteristics that seem to attract robbers. Robbers seem to like multiple entrances to a building, a higher number of tellers, a longer distance between any two tellers, and reduced visibility from within or outside of the bank (Baumer and Carrington (1986)), seem to dislike security doormen

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[6] In 2011 on average only 0.3 bank robberies took place per day, coincident with 1 kidnapping, 18 sex crimes, 35 store robberies, 40 homicides, 60 car or motorcycle thefts, 103 cases of domestic violence and 166 larceny events for example. *Source*: Ministerio de Defensa Nacional. Republica de Colombia.

[7] Only in Dick (1956), adapted in the movie *Minority Report* (2002), is the police able to actually prevent crime from occurring by apprehending criminals based on foreknowledge (in this story provided by three psychics called "precogs").

[8] Bank mergers if and when constraining access to credit may result in more crime in a local community, a seminal study by Garmaise and Moskowitz (2005) shows.

(Hannan (1982)), but do not seem to care much about other commonly used security equipment. To account for these observable and other unobservable branch characteristics, that may attract or repel also robbers with certain motives (Johnston (1978)), we include branch-event fixed effects.

While in general robberies are difficult to predict in space and time, there is one exception. Branches do get robbed multiple times, often within a short period of time (e.g., Lamm Weisel (2007) for the US), either because robbers thought they had left unfinished business (and there was still money on the table), or it was easy to pull off (so why not visit again for a second serving), or competing robbers copycatted. While we have branch-event fixed effects and compare only 90 days before and after (this also removes the possibility any recurrent robbery takes place), we also remove those branches that are robbed multiple times in robustness.

b. Time

Yet even despite this observed multiplicity, robberies remain rare, i.e., even the re-visitations are not that common and in time still almost random. In our total sample of robberies for example, there are 63 re-visitations, with an average time between them of 1.3 years.

Most of the robberies are holdups,[9] either by lone bandits or teams. Lone bandits that are armed or unarmed often act ill-prepared and on a whim. Not to be recognized afterwards lone robbers rarely case the branch they rob. Teams are always armed and are typically more prepared, in terms of location, but even then the exact branch they hit and the exact timing of their actions are not that well predictable.

[9] Of the 835 robberies in the dataset 474 are bank holdups and 260 teller holdups. There are 38 cases of tunneling, 11 entries during closing hours, and 7 cases of staff impersonation. 35 cases are classified as "other" or were left unclassified.

In some countries a lot more robberies take place on a Friday as branches sit on payday money (and the opportunist robber may need money for weekend partying) or those other days of extended opening hours (Lamm Weisel (2007)), but that does not seem to be so overwhelmingly the case in Colombia.[10] There are also more robberies during winter time in countries where collars and hats are then commonly worn then, but again this not the case in Colombia as there are no real seasons. The aforementioned set of branch-event fixed effects also account for observed and unobserved heterogeneity in the calendar timing of the robbery.

2. The Impact of Robberies

Robberies are potentially traumatic events. Bank employees (and also customers) may be threatened, injured, taken hostage, or even killed. Miller-Burke, Attridge and Fass (1999) and also Leymann (1988) for example document that for many employees, experiencing a robbery in the branch they worked, suffered negative consequences in a variety of areas affecting both their individual life and their company. "To varying degrees, this impact included experiencing numerous clinical symptoms of post-traumatic stress, greater perceived stress, worse physical health, impaired productivity at work, less desire to continue working for the current employer, and problems in both work and personal relationships."

The negative impact of the workplace trauma was worse when the robbery was more intense, i.e., a weapon was used by the robber, there was close proximity to the robber, and the perceived personal threat was high. These effects were not moderated,

[10] Of the 835 robberies in the dataset, 105 take place on Monday, 172 on Tuesday, 150 on Wednesday, 163 on Thursday, 192 on Friday, 41 on Saturday and only 12 take place on Sunday (likely because most if not all bank branches are closed then).

Miller-Burke, Attridge and Fass (1999) find, by the potentially confounding factors of employee age, sex, job position, though ex ante employee training can help assuage the emotional effects of victimization (Lamm Weisel (2007)). So these findings suggest reaction to robbery are not or only weakly related to (for us unobservable) employee characteristics.[11]

Similarly Kamphuis and Emmelkamp (1998) document that employees who had experienced a robbery evidenced significantly higher psychological distress than their non-victimized colleagues. Within the group of robbed employees, a correspondence was found between the time elapsed since the robbery and their current level of psychological distress. These findings suggest significant psychological distress reactions following bank robberies, which decrease over time. We will therefore investigate how the impact of bank robberies on loan terms dissipates over time.

And Kleim, Ehlers and Glucksman (2007) show that after experiencing a violent traumatic event, such as a robbery or terrorist attack, most people show some symptoms of acute stress disorder, but that only a minority develop persistent symptoms of sufficient severity to warrant a diagnosis of posttraumatic stress disorder (PTSD), which can be predicted to occur after six months from as early as two weeks after the attack (see also Kleim and Ehlers (2009)). Hence we will also study the time trend in the effects after the robbery.

[11] We did not find any evidence in the literature that *ex post* media coverage (see e.g., Aronson (2012) on media contagion) or capture of the robbers mitigates trauma (there is no immediate robbery-specific information on media coverage or robbers` arrests available for Colombia in any case). We surmise that coverage or capture may not be moderating factors *per se* and/or that few robbers are caught immediately. For example for Italy Mastrobuoni (2014) reports that the perpetrators were arrested in only 7 percent of the 4,972 bank robberies recorded between 2005 and 2009; Italy actually witnessed almost 60 percent (*sic*) of all bank robberies in Europe during that time period. For the US the *2011 FBI Bank Crime Statistics* show that only in 20 percent of the 4,534 bank robberies in which loot was taken there was eventually full or partial recovery.

3. Testable Hypotheses

Recall that Raghunathan and Tuan Pham (1999) posits that anxiety is generally experienced in response to situations where the person is uncertain about an impending outcome of a personally relevant event, especially when the outcome is potentially harmful (e.g., "is the individual sitting in my office potentially a robber and dangerous"), and feels unable to alter the course of events (e.g., "I am a loan officer and I have to talk to all loan applicants), and that anxiety influences decision makers in the content of their "dark" thoughts ("a robbery can easily be repeated here at this branch now"), motives ("I want to avoid contact with potential robbers"), and process of decision-making ("It is all futile, I don't care anymore").

Following a robbery we therefore expect loan officers that suffer from anxiety to make loans that require less contact with the applicant, now and in the future. Less willingness to roll-over a loan soon may lead to longer loan maturity; less willingness to monitor and deal with a client in case of non-performance may lead to more collateralization (à la Manove, Padilla and Pagano (2001)); less contact with an applicant during negotiations should result in a lower interest rate (and a higher loan amount) that the loan officer offers to the client.

IV. METHODOLOGY

We employ a difference in difference approach to measure what effect a bank robbery has on loan conditions. The treatment group for each event corresponds to the loans granted locally by the bank which was robbed, and the control group corresponds to the loans that were granted by all banks in the rest of the country. For

each bank robbery we define an event window that comprises loans granted 90 days before and 90 days after the bank robbery.

The econometric model takes the following form:

$$Y_{ijtk} = \beta_0 + \beta_1 Branch\ Robbed\ x\ after_{jtk} + \boldsymbol{B_{tk}} + \boldsymbol{A_{tk}} + \boldsymbol{\theta_{jk}} + \varepsilon_{ijtk} \qquad (1)$$

where i, j, t and k index firm, branch, time (in days) and event respectively.

In equation (1), Y_{ijtk} represents one of the loan conditions. For each loan condition we estimate a different regression: *Maturity* is the maturity of the loan in months and *Collateral* is an indicator variable equals 1 if the loan is collateralized and equals 0 otherwise. *Collateralization* is the ratio of the collateral and loan amount. *Interest Rate* is the interest rate of the loan in percent and *Loan Amount* is the amount of the loan in millions of Colombian pesos (COP).

The variable $Branch\ Robbed\ x\ after_{jtk}$ is equivalent to the interaction term in a regular difference in difference analysis. It is a dummy variable that equals 1 for the loans that were granted by the robbed branch after a robbery took place. Thus, β_1 is our coefficient of main interest. $\boldsymbol{B_{tk}}$ and $\boldsymbol{A_{tk}}$ correspond to $before\ x\ event$ and $after\ x\ event$ fixed effects, respectively. These two sets of fixed effects account for temporal differences in loan conditions within the event window. Finally, $\boldsymbol{\theta_{jk}}$ corresponds to branch-event fixed effects. They capture any systematic differences across branches (included in treated or control group) for each event.[12]

[12] Given these short time windows that are part of our identification strategy to uncover the temporary changes in behavior of the loan officers and the many small firms observed to borrow infrequently from only one bank, it is not practical to include firm (or firm-day) fixed effects to control for (the

Findings in the psychology literature suggest that loan officers experience several stress symptoms during the first weeks after the robbery that gradually disappear for most of the loan officers. In view of this fact, we should expect to find a greater effect on the loan conditions for the first few weeks after the robbery, and less so for the following weeks. We test if this is the case by interacting the variable $Branch\ Robbed\ x\ after_{jtk}$ with the variable $ln\left(Days\ After\ the\ Robbery_{tk}\right)$, which indicates how many days after the robbery the loan was granted.

V. DATA

We focus on robberies in Colombia, where previous research has also investigated the cultivation of coca and conflict (Angrist and Kugler (2008)) and kidnappings (Pshisva and Suarez (2010)) for example.

[Table 1 around here]

For our analysis we use the two datasets we already briefly introduced. The first one comprises information of the bank robberies that took place in Colombia from 2003:1 to 2011:12 and was collected by *Policía Nacional de Colombia*, the Colombian National Police, and as already indicated it includes information on the address of the robbed branch, the date of the robbery, the amount robbed,[13] the weapon used and the

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robbery-induced changes in) demand. Given that most if not all loan officers will experience the robbery but only few customers will, we surmise that the estimated changes are caused by changes in the behavior of loan officers. We will return to assessing the changes in customer behavior in robustness.

[13] While this information comes directly from the Police and not from Press reports we cannot entirely discount the possibility of underreporting of the amounts robbed to dissuade aspirant robbers. If this

type of robbery.[14] The dataset contains 835 bank robberies that took place in 170 municipalities and 652 different branches of 28 different banks. The average amount robbed was equivalent to 37,000 US dollars, which represents less than 1 percent of the total deposits of a bank at the municipality level! About 3 percent of the bank robberies were done without arms, in 89 percent firearms were observed, and the rest was done with the use of so-called "white" weapons, i.e., knifes and sharp instruments.

The second dataset is a credit register that contains information about individual commercial loans reported by financial institutions to the *Superintendencia Financiera de Colombia*, the regulator of Colombian's financial system.[15] This dataset provides a detailed look at all the loans granted by the financial system to firms on a daily basis. Characteristics such as loan maturity, collateral, interest rate and amount, and (crucial for our purposes) the exact date of origination are included from 1998:12 to 2010:12. The dataset contains 2.5 million loan observations made to 32,965 different firms by 120 different financial institutions. Given that we are interested in understanding the role of emotions on the process of granting loans, we focus only on new loans at origination. This corresponds to 316,138 loan observations.

While we do not know the specific branch where a loan was granted, we do have information on the physical location of the firm at a municipality level. Therefore, under the assumption that firms go to the nearest branch, we can determine in which municipality the loan was granted. However, if there is more than one branch of the

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underreporting is systematically proportional, however, our variable capturing the robbed amount will still incorporate the same variation.

[14] As far as we can tell information on injuries and casualties associated with each robbery is not systematically recorded and centrally collected and is not publicly available.

[15] The dataset was provided to us due to a direct link of one of the authors of this paper with the Central Bank of Colombia.

same bank in a given municipality, we are not able to identify in which of them the loan was granted and consequently our exercises will be based on the entity-municipality level, and not on the exact address of the branch.

Clearly this approach may affect our results. The effect of a bank robbery for example might be intensified in densely populated municipalities, where there may be several branches of the same bank located within very short distances, sometimes even within one or two blocks. Given this proximity of the branches in a densely populated municipality, news may spread quickly from one branch to the other. Thus, the effect of a bank robbery might be propagated across branches in the same municipality. Employees of other branches will feel terrified of having to go through a similar experience and given this "emotional contagion" (e.g., Hatfield, Cacioppo and Rapson (1993)) they might react accordingly. Therefore in (unreported) robustness we include interactions with measures for the density of branches of the robbed bank at a municipality level (i.e., the number of branches per square kilometer) and find indeed such effect.

Finally, in terms of the data we employ, we note that the auxiliary information on firm characteristics, such as their physical location, industry and financial statements, is provided on a yearly basis by the *Superintendencia de Sociedades*, the government institution that regulates non-financial firms.

As previously mentioned, we focus on the loans that were granted 90 days before and 90 days after a robbery. Restricting our sample to this event window helps us to rule out structural changes in the process of granting loans, i.e., monetary policy changes, internal organizational changes or even changes of loan officers. In addition, and in order to limit the probability that our results will be driven by differences in the loan applicants, we include only the firms that get loans both before and after the

robbery, in the treatment group or in the control group.[16] After including these adjustments to our sample, we end up with 389 bank robberies. 224 of them are bank holdups, 151 teller holdups, 6 tunneling and 2 impersonating staff.

Our final dataset consist of 3.17 million loan observations, which comprises 35,487 that were granted by the robbed branches, and 3.13 million that were granted by other branches in the rest of the country. These loans where provided by 1,649 branches of 28 banks to 17,067 firms in 246 different municipalities. Table 1 provides further sample details.

VI. RESULTS

1. Main Findings

Table 2 shows detailed summary statistics of the variables used in this study. Our dependent variables correspond to the loan characteristics: *Maturity*, *Collateral*, *Collateralization*, *Interest Rate,* and *Loan Amount*. The mean maturity is 8.7 months, around 18.4 percent of the loans are required to pledge collateral and the average collateralization is 15.4 percent. The mean interest rate is 17.5 percent and firms are granted loans of 927 million COP (about 515 thousand U.S. dollars) on average. However, as evidenced by the standard deviations, there is a substantial variation in the loan conditions.

[Table 2 around here]

[16] Not imposing this restriction leaves our findings virtually unaffected confirming that the composition of firms does not play a major role in determining our findings.

As part of our independent variables we include relationship and firm characteristics to control for the creditworthiness of the borrower. Among relationship characteristics we include the *Length of Relationship* that measure the stock of private information about the borrower that the bank has acquired (Petersen and Rajan (1994), Berger and Udell (1995)). The average *Length of Relationship* in our sample is 14.2 quarters. We also include *Main Bank* that indicates whether the loan is granted by the firm's primary source of financial services, and capture the scope of the relationship. In our sample, about 20 percent of the loans are granted by the firm's main bank.

Among the firm's characteristics we include a *Small Firm* dummy*,* as an indicator variable for the size of the firm. Small firms are generally considered to be less transparent and have less bargaining power than their larger counterparts. In our sample, about 30 percent of the loans are granted to small firms. We also include *Age as Borrower* as a measure of the amount of public information available about the firm (Petersen and Rajan (1994), Berger and Udell (1995)). In our sample, the average *Age as Borrower* is 26.8 quarters. Additionally we include *Number of Relationships* that is measure as the number of banks with which the firm has an outstanding loan prior to the origination of the new loan. The average *Number of Relationships* in our sample is 6.0. Finally, we include *Arrear (t-1)* and *Firm Rating* as measures of the quality of the borrower. *Arrear (t-1)* indicates whether a firm had an arrear, in at least one of its loans, one year prior to the origination of the new loan. About 10 percent of the loans in our sample were granted to firms that had an arrear the year before the origination of the new loan. *Firm Rating* is the average quality rating of the outstanding loans of the firm. The quality rates are observable by banks and range from 1 to 5, where 1 indicates poor quality and 5 good quality. The average *Firm Rating* in our sample is 4.9.

Considerable insight can be obtained simply by comparing loan and firm characteristics of the robbed and the branches *in the rest of the country* (in robustness we will report *in the rest of the region*). Table 3, shows the differences in means between these two groups of branches for each of the aforementioned variables, both before and after the bank robbery. The last column presents a test of the differences in differences. For the loans granted before the bank robberies we do not find significant differences for *Collateral*. However, we do find significant differences for *Maturity, Collateralization, Interest Rate,* and *ln(Loan Amount)*. These differences might be explained by differences in the characteristics of the borrowers. And consistently, we find significant differences in all the relationship and firm characteristics. Moving to the loans granted after the bank robberies, we find significant differences for all the loan conditions, except for *Interest Rate*. The differences in the relationships and firm characteristics are similar to the ones found for the loans granted before the robbery. That is, the differences between the clients of the two groups remain the same. The test of the differences in differences suggests that there are significant changes in the conditions of the loans granted by the robbed branch after the bank robbery. Moreover, the test suggests that the characteristics of the corporate clients of the robbed branches versus the control branches remain the same before and after the robbery.

[Table 3 around here]

To better illustrate where identification of the impact of interest comes from, Figure 1 presents the time path of a fifteen days moving average for each of the loan characteristics, by robbed branches and control branches. The vertical line represents

the dates of the robberies. Inspection of the graph for *Maturity* suggests the presence of similar trends for the robbed and the control branches. The gap between the two lines, however, is reduced after the bank robbery (Panel A). For *Collateral*, similar trends are observed for both groups, although the gap between them seems to increase after the bank robbery (Panel B). For the *Interest Rate* similar trends are also observed. However the interest rate seems to reach lower levels for the robbed branches after the robbery (Panel C). For the *Loan Amount* the trends of the two groups are not easily comparable due to high volatility. The gaps between the two groups, however, seem to increase after the robbery (Panel D).

[Figure 1 around here]

As discussed before, we use a difference in difference approach to measure what effect a bank robbery has on loan conditions compared to branches *in the rest of the country*. Our main results are in Table 4 and comprise for each dependent variable 5 different models (in Appendix Table A.1 we report the mostly unchanged estimates when comparing to branches *in the rest of the region*). Model I corresponds to the model presented in equation (1). Model II, includes an interaction term with the variable *ln(Days After the Robbery)*. This term allows us to test if the effects on the loan conditions gradually disappear as the number of days after the robbery increase. In Models III, IV and V we include interactions with characteristics of the bank robberies. In particular, we include *Firearm,* a dummy for the robberies that were made with the use of firearms; and *Robbed Amount*, a variable that measures the robbed amount as a percentage of the total deposits of the robbed branch. With these variables we aim to test if the degree of violence employed in the bank robbery has a

differential effect on the loan conditions. Moreover, we aim to rule out the possibility that our results are being driving by monetary considerations rather than by the psychology effects experienced by the employees.

[Table 4 around here]

The results strongly suggest that there is an overall increase in the length of *Maturity* after a bank robbery, by 0.7 months in Model I. According to Model II maturity increases by more than 3.3 months right after the robbery but gradually decreases as the number of days after the robbery increase. The effect halves within 10 days and vanishes entirely around 110 days after the robbery. We do find a differential economically relevant effect for the robberies that were made with the use of firearm, but the effect is estimated imprecisely. The robbed amount does not have an effect on *Maturity*.

We do not find evidence of a persistent effect on collateral as shown by Model I. However, when we include the interaction with *ln(Days after the Robbery)*, we find that the likelihood that a firm is required to pledge collateral increases by 3.4 percent right after a bank robbery. And this probability decreases as the number of days after the robbery increase (Model II). The effect is halved in less than 8 days and is overturned 64 days after the robbery. Nonetheless, the results presented on Model III suggest that the increase on the likelihood of collateral is present only when the use of firearms is involved in the bank robbery. The branches whose robberies where made without arms or other types of arms experienced the opposite effect. Moreover, Models IV and V show that the effects of a bank robbery over *Collateral* are also not affected by the robbed amount.

Similarly, the results suggest that there is an effect on *Collateralization* (Model I). However, the immediate increase of 3.9 percent in the level of collateralization also dissipates over time (Model II). The effect is halved 5 days after the robbery and is overturned 28 days after the robbery. As with *Collateral*, this pattern is present in *Collateralization* only when the use of firearms is involved in the bank robbery. When less violent or no arms are used the effect is the opposite. Models IV and V show again as before that the effects of a robbery on *Collateralization* are not affected by the robbed amount.

For the *Interest Rate* we find that there is an effect that persists 90 days after the robbery. The effect corresponds to a decrease on the interest rate by 0.34 percent (Model I).[17] And according to Model II, this effect does not disappear as the number of days after the robbery increase. However, as Model III shows, the decrease on the interest rate is only present in the branches in which firearms were used in the robbery. For the rest of the branches there is an increase of the interest rate. It increases by 2.6 percentage points right after the bank robbery and decreases as the number of days after the robbery increase. Models IV and V again show that the effects of a bank robbery over *Interest Rate* are not influenced by the robbed amount.

Finally, we also find that there is an increase in the *Loan Amount* after a bank robbery. The increase corresponds to 3.7 percent of the mean loan amount (Model I). The effect, however, do not seem to decrease over time or be affected by the use of firearms in the robbery. Finally, the robbed amount does not have an effect on the

[17] The semi-elasticity (i.e., as a percentage of the mean dependent variable) equals -2.0 percent which in absolute value is the smallest of all studied loan terms. This is consistent with the possibility that credit spreads, but not other loan terms, are "anchored", i.e., that the path of credit spreads since the last loan influences the level at which a firm can currently borrow (Dougal, Engelberg, Parsons and Van Wesep (2015)).

Loan Amount. This further shows that our results are not being driving by monetary considerations.[18]

The results are consistent with the hypothesis that, due to a combination of emotions experienced after a bank robbery, loan officers deviate from their traditional approach of processing the loan applications. However, as the number of days after the robbery increase, most of the emotions disappear and loan officers return to their usual approach of dealing with clients. Moreover, the effect on the loan conditions seems to depend on the degree of violence of the robbery.

In firearm robberies, loan officers seem to adopt strict avoidance behavior: They decrease the likelihood of having contact with the clients in the near future by lengthening maturity and by increasing the collateral requirements on loan contracts. Loan officers also reduce the bargaining time with applicants by granting loans with lower interest rates. On the other hand, loan officers that are present in less violent robberies decrease the collateral requirements and charge a higher interest rate.

The fact that the results differ according to the intensity of the robbery might suggests that different emotions are triggered depending on the levels of potential violence experienced. In firearm robberies, loan officers face a potentially severe life-threatening experience, thus fear could be the most likely emotion to prevail. On the other hand, loan officers that are present in less violent robberies will be less terrified. Instead of fear, the emotion that could be more predominant is anger. They could feel anger because their space and security has been violated and they were not able to prevent the incident. In line with this reasoning Lerner and Keltner (2001) find that

[18] In unreported results we estimate an additional specification, one for each of the loan conditions, where we include interactions with an indicator variable that equals one when the robbed amount is very high (we use various percentile cutoffs), and equals zero otherwise. The coefficients on these interactions are also not statistically significant.

fear and anger have opposite effects on risk perception. Whereas fearful individuals made pessimistic risk adverse choices (see also Christelis and Georgarakos (2013) and Cohn, Engelmann, Fehr and Maréchal (2014)), angry individuals made risk-seeking choices. This difference in behavioral outcomes seems to be consistent with our results overall.

We note that the relative size of each of the effects may be influenced by the intermediation margin that loan officers have on each of the loan conditions (the discretion that loan officers have for each variable). However, our results are robust to different specifications that include as control the "other" loan characteristics (see Appendix Table A.2).[19]

We also study how individual loan ratings are affected (even though loan officers may not have full discretion for all loans to set a new credit rating) and find that better loan ratings are recorded after the robbery, but that this effect is not influenced by the time since or the intensity of the robbery.

[Table 5 around here]

Finally, we are curious about the non-performance of the loans that were granted after a robbery. If loan officers set loan terms optimally before the robbery, c*eteris paribus* we would expect loans granted after a robbery more likely to be eventually non-performing. This is exactly what we find and report in Table 5. The probability of arrears on loans increases by 0.8 percentage points after a robbery (its mean equals 2.7 percent), while the time in arrears increases by 0.019 quarters or 2 days (its mean

[19] Self-evidently these are "bad" controls (Angrist and Pischke (2008)) to the extent that they are also affected by the robbery.

equals 5 days). The half-life of these effects equals 12 and 7 days, respectively, in line with our findings so far (though the estimated coefficients in Models II are not statistically significant).

2. *Further Explorations*

a. Re-visitations

As mentioned before, some branches do get robbed multiple times, and as noted before this is an often observed phenomenon in robbery statistics. In our selected sample there are in total 40 "re-visitations".[20]

Re-visitations can affect our results in several ways: First, if they occur within a short period of time, their effects on the loan officers and consequently on the loan conditions might overlap, making it difficult to disentangle the effects of a particular event. Second, if re-visitations are more spread over time, security at the robbed branch could have been improved and in addition loan officers could be better prepared to cope with the traumatic event in case a robbery occurs.

In order to make sure that the effects of re-visitations are not affecting our results, we exclude the bank robberies made to branches that were robbed more than once within our sample period by relying on our information on the exact address of the robbed branch. The estimates are presented in Appendix Table A.3 and are very similar to those already reported. The magnitude of the coefficients decreases, but their signs remain the same and also the level of statistical significance overall

[20] We also assess the impact of placebo pre-visitations of a branch, one year (or half a year) prior to the first actual robbery. We find that the main results of interest (i.e., reversal and fire-arm) are no longer statistically significant and/or economically relevant in most specifications.

remains almost unchanged. This suggests that our results are not being driven by the effects of re-visitations.

In addition, we analyze separately what is the effect of re-visitations. If loan officers of branches that were previously robbed receive training to cope with this type of violent event or get otherwise inured to crime, the effect of re-visitations over the loan conditions should be less pronounced. On the other hand, if no psychological treatment is received after a robbery, loan officers might get a stronger trauma after a new incident. We re-estimate our model for the sample of robberies that correspond to re-visitations. The results, presented in Table 6, show that re-visitations have bigger economic effects over the loan conditions than first time robberies. This suggests that previously robbed branches are not better prepared to deal with a new robbery.[21]

[Table 6 around here]

b. Branch Size and Bank Type

Loan officers at small branches are more likely to have witnessed the robbery first-hand and it may be more difficult for them to stay at home afterwards (although it also increases the probability the branch will be closed). At the same time, loan officers at small branches may *ceteris paribus* be more familiar with their customers. Interacting the variables After and Days After with a dummy for branch size which equals one if the branch is smaller than 25 (or 50) percent of all bank branches with

[21] We also interact the after and days after variables with the number of robberies a branch experienced during the last three years or alternatively a dummy that equals one if at least one robbery took already place at the branch, and equals zero otherwise, but we find similar results.

respect to the volume of loans in its portfolio, and equals zero otherwise, we find little statistical significance on the estimated interaction coefficients.

Next we also consider bank type. Given stricter regulations in their country of origin branches of foreign banks may provide better protection and training for their employees, such that in case of a robbery these loan officers are less traumatized. Similarly given their status within the governmental administration, employees at state banks may also receive better protection and training. Interacting the variables After and Days After with a dummy for branches of either foreign or state banks (in unreported regressions), we indeed observe a statistically significant reduction in the effect of a robbery across loan terms.

c. Large Firms, Small Loans, Long Relationships

We then analyze if there is a differential effect on the loan conditions of loans granted to large firms. As these firms typically receive more transactional loans, they might be less affected by the emotions experienced by the loan officers. We therefore, expect to find a less pronounced effect of a bank robbery over loans granted to big firms. In addition, we analyze if there is a differential effect over relatively small loans. Given that these loans are more likely to be approved directly by loan officers, a not by higher hierarchy levels, they are more exposed to the emotions of the loans officers. In line with this, we expect to find a more pronounced effect of a bank robbery over small loans. Finally, we look at loans granted to firms that have had already a long relationship with the bank. On the one hand, these loans may be more relationship-based and require more personal attention; on the other hand, the loan officer may feel more comfortable with the firm manager given their long-standing personal ties. In line with the latter argument, we expect to find a less pronounced effect of a bank robbery on loans granted to a firm with a long relationship.

We estimate three additional specifications, for each of the loan conditions, which include interaction terms with indicator variables for large firms (upper 25th percentile based on the total assets of the firms) and for small loans (lower 25th percentile based on the loan amount), and the length of the relationship. Our (unreported) results suggest that the effect of a bank robbery is less pronounced over loans granted to large firms. These results, however, are not statistically significant. We also find that the effects of a bank robbery are stronger for small loans. This is consistent with the fact that emotions are more prone to be transmitted over loans approved directly by the loan officers, who are the employees that have a direct exposure of the violence of a bank robbery. Finally, we find that if anything the length of the relationship somewhat mitigates the effect of a robbery (see Appendix Table A.4).[22]

3. Potential Alternative Explanations

a. Accumulation of Work

There is no regulation or standard practice in Colombia that prescribes how many days to close a branch following a bank robbery. Instead, each branch arbitrarily chooses the number of closure days, if any. This could partly affect our results, as the closure of a branch might generate an accumulation of applications to be dealt with once the branch is re-opened. If the number of closure days is large, the excessive amount of work might alter the loan officer's response to a particular loan application.

[22] While few firms maintain only one bank relationship in Colombia (see also Qian and Strahan (2007)), we re-estimate the effect of robberies on lending terms for these firms because these borrowers are less likely to have an immediate choice of another lender right after the robbery. The estimated coefficients are similar in sign and magnitude but the much lower number of observations robs most estimates of their statistical significance.

If this is the case, we should be able to find a differential effect for branches with large closure periods.

As we do not have separate information on branch closures, we use the number of days in which a robbed branch did not grant any commercial loans as a reasonable proxy. Based on this measure, we find that in 119 bank robberies (out of the 389 bank robberies included in our selected sample) the branch is not closed the day after the bank robbery. In the rest of the bank robberies there are closures (or periods of not granting commercial loans) that vary between 1 and more than 15 days. We interact our main specification with the number of closure days. The results (unreported), however, are not statistically significant and small in magnitude. This suggests that the potential effects of branch closures are not driving our results. If anything the sign of the coefficients suggest that the effect of a bank robbery over the loan conditions decreases with the number of closure days. This is likely to be associated with a decrease of the symptoms experienced by the loan officers.

Hence our findings are not consistent with the possibility that branches close and work accumulates. But work could also accumulate with individual loan officers, because other loan officers call in sick, spend time in counseling to mitigate distress symptoms (Leeman-Conley (1990)), or seek to quit their job altogether (Miller-Burke, Attridge and Fass (1999)).

Yet, none of these actions are very likely in Colombia. Due to low sick payments,[23] sick leaves are expected to be less common there than in many other countries around

[23] Sickness absences are typically found to be more common in countries where full pay periods for temporary incapacity are predominant than in countries where this is not the case (e.g., Gimeno, Benavides, Benach and Amick (2004)). In Colombia sick employees receive only 66.7% of their salary during the first three days of absence paid by their employer. Afterwards payments are made by the General Health Social Security System but obtaining such payments may take time and effort. Not surprising then maybe that in a report published by the International Trade Union Confederation

the world; counseling is typically not provided; and, quitting and/or switching jobs is very difficult in the short run as the unemployment rate ranges between 10 and 15 percent during the sample period (which is always almost 5 percentage points higher than in the rest of South-America), the labor market is rigid and unemployment benefits before 2013 were close to zero. All of this makes it unlikely work would accumulate with a few resilient loan officers, while the aforementioned branch closure evidence suggests work accumulation cannot explain the direction of the change in loan terms immediately after the robbery in any case.

To deal with the workflow more easily, loan officers could in general cherry-pick applications.[24] They could choose to review the most easy-to-approve and important loans immediately after the robbery, while deferring other more difficult applications for later. Granting easier (collateralized and safer, i.e., with longer maturity and lower interest rate) and more important (i.e., larger sized) loans first would be observationally equivalent with our findings so far on loan terms, but it would not be consistent with the worse performance on these loans we observed in Table 5.

[Table 7 around here]

Table 7 further demonstrates the number of loans drops significantly after a robbery (its mean equals 2) with a half-life of 7 days to recover fully after 44 days, especially when a fire-arm is used; hence, loan officers may temporarily seek to avoid customers

(ITUC) in May 2014, Colombia was listed as one of the "worst countries in the world to work in", and is compared to Cambodia and Zimbabwe.

[24] Alternatively, interim employees could be hired leading to a temporary loss of private and/or soft information, leading to more lending based on publicly-available hard information. But we did find that if anything the length of extant bank-firm relationships somewhat mitigates the effect of a robbery (see also Appendix Table A.4) which would not be the case if the loss of information drives our findings.

and that even when they would be granting the "easy" loans first they fail to correctly set conditions (as evidenced in Table 5) potentially due to their lack of concentration as a consequence of the robbery.

b. Changes in Bank Policies

After a robbery occurs, the bank may revise its risk policy and shifts its credit origination from riskier loans to safer loans. While not impossible we think that the immediate reaction and short half-life of the observed changes are not consistent with bank-wide policy changes. For example in Dessaint and Matray (2015) it takes more than 180 days to observe the maximum corporate response which comes with a half-life of one year or more.[25]

But to investigate this possibility further we check if loan terms change across the affected bank branches in a region (Appendix Table A.5). So now the treatment group contains the loans granted within the region but not the municipality where the robbery took place, while the control group comprises all loans granted by other banks in other municipalities. Interestingly, we find that there is some impact on loan terms in the region, but that it is three or more times smaller and once again immediate and reversed quickly. This is not consistent with changes in regional bank policy which likely would be applied homogenously and would take some time to implement and reverse, but rather is consistent with "emotional contagion" between loan officers across the regional bank branches of the affected bank (e.g., Hatfield, Cacioppo and Rapson (1993)). We then check if loan terms change across the entire affected bank after a local robbery, and in unreported regressions we find they do

[25] They study how managers respond to the occurrence of a hurricane event when their firms are located in the neighborhood of the disaster area. They find that managers increase the amount of corporate cash holdings (and to express more concerns about hurricane risk in 10-Ks/10-Qs) even though the real risk remains unchanged.

somewhat but that this potential contagion effect is now even smaller (and close to economically meaningless). Recall that we find a similar contagion when we assess how the affected bank branch density at the municipal level reinforces the changes in loan terms.

c. Effect on Customers

While most if not all employees at the robbed branches will experience the robbery, only few customers present in the branch at the time of the robbery will.[26] However in principle not only bank employees but also customers might feel threatened and experience stress. Their reaction may have an impact on their demand for credit at the robbed bank and also on the level of deposits they keep in that bank.

Ideally, we would like to analyze what is the effect of a bank robbery on the number of applications and especially the loan terms that are requested by the applicants. In the absence of this information,[27] we use the total number of loans granted by each branch as well as the total amount lent before and after the robbery to determine if customers stop going to the robbed branch. We replicate Table 7 but now eliminate the restriction that a firm has to be granted loans in the period before and after the robbery, so that we can take into account the possibility that customers stay home longer after the robbery. However, in further unreported regressions we find that overall the drop in the number of loans obtained is substantially smaller for all firms than for those firms that borrow before and after a robbery. This suggests that customers do not stop applying for new credit at the robbed branch.

[26] Notice that loan officers (present during the robbery or closely connected to those present) may be responsible for granting hundreds of loans within our estimation period, the few customers present will be tied to at most a handful of loans.

[27] No credit register in the world records comprehensive application information. Jiménez, Ongena, Peydró and Saurina (2012) for example use the information requests lodged by banks as a proxy for the number of applications. Only single-bank datasets contain detailed application information (e.g., Agarwal and Hauswald (2010), Brown, Kirschenmann and Ongena (2014)).

Moreover, the results for the total amount lent (its mean equals 222,144 Million COP), presented in Table 8 suggest that there is a slight increase on the total amount lent by the robbed branches. The increase corresponds to 2.8 percent of the average amount lent by a branch. The results are robust to different specifications that include event fixed effects and branch fixed effects.[28]

[Table 8 around here]

On the other hand, if depositors are afraid of losing their money after a robbery, they might run on the robbed branch (or other branches of the same bank) to withdraw all their money. Anticipating this, banks may actually transfer some extra liquidity to the affected branch(es). If on the contrary customers are afraid to go to the branch, they might decide to keep their money in the bank for a longer period than usual (even if they could withdraw from another bank, there are fees that might stop them from doing so).

To assess these possibilities we perform an exercise similar to the one performed for the loan conditions, but we now use the amount of deposits as a dependent variable. The information on the amount of deposits is gathered from the website of the *Superintendencia Financiera de Colombia*. It is dis-aggregated at the *bank-municipality* level but it comes (unfortunately only) at a quarterly frequency.

Our (unreported) estimates suggest that there is only a modest increase in the level of deposits in the quarter after a bank robbery (that equals one fifth the standard

[28] As to changes in other loan terms we note that if borrower preferences would change, this may especially affect relationship loan outcomes. Recall from earlier discussion that if anything the length of the relationship somewhat mitigates the effect of a robbery which could imply that borrower preferences after a robbery change in an opposite direction than loan officer ones.

deviation in deposits). This is consistent with the idea that depositors are afraid to visit the bank and prefer to keep their deposits in the bank for a longer period, or that the bank provides some more liquidity to the affected branch(es). The small effect, however we find, is not sensitive to the time elapsed since the robbery, the degree of violence or the robbed amount, nor to the type of deposit (i.e., current account, fixed deposit, saving account) involved. Hence, changes in deposits do not seem to provide an alternative explanation to the changes in loan conditions we estimated earlier.

VII. CONCLUSION

In this paper, we study the impact of emotions on real-world decisions made by bank officers. We do so by analyzing the loan conditions of loans granted immediately after an exogenous violent event that is expected to have an effect on loan officers' emotions. The exogenous event we focused on is bank robberies. Our study is the first one that attempts to understand the link between loan officers' emotions and loan officers' decisions over loan conditions.

We employ a difference in difference approach where the treatment group for each event corresponds to the loans granted locally by the bank whose branch was robbed, and the control group corresponds to the loans that were granted in the rest of the country (or region). In order to rule out structural changes in the process of granting loans we define an event window for each bank robbery that retains only those loans granted 90 days before and 90 days after the bank robbery. In addition, we include a set of branch-event fixed effects in order to account for any observable and unobservable branch specific heterogeneity across time.

We find significant differences in conditions of the loans granted after a robbery suggesting that loan officers do change their decisions following this event. In general loan officers seem to adopt so-called avoidance behavior: They decrease at once the likelihood of having contact with the client by lengthening the maturity of the loan contract and by demanding more collateral thereby reducing the probability of loan non-performance (and dealings with the client) prior to maturity. However, these effects dissipate as the symptoms experienced by the loan officer wear off. In addition, loan officers grant loans with *ceteris paribus* slightly softer loan conditions: Lower interest rate and a higher loan amount, possibly reflecting a reduced willingness to spend face-to-face bargaining time with applicants.

These effects, however, vary depending on the severity of the robbery. In robberies where the perpetrator carries a firearm, loan officers subsequently adopt stricter avoidance behavior, with longer maturity and higher collateral requirements, and the correspondent lower loan rates and higher loan amounts. But in those robberies where there was no firearm involved, collateral requirements and loan amount initially drop while loan rates increase.

Finally, although in this study we analyze a single type of event (bank robberies), loan officers (as any individual) might experience several different events that could have an effect on their emotions and subsequently on the loan conditions. Strategies for emotions regulation could help to mitigate the effects of emotions on loan conditions.

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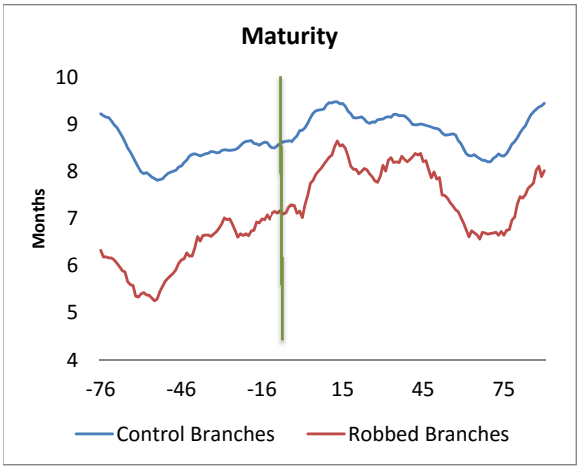
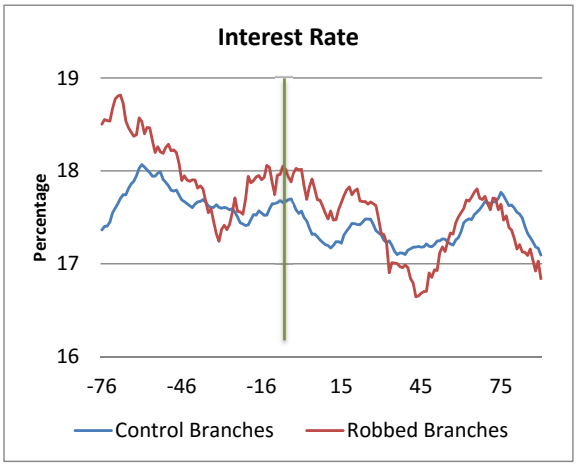
FIGURE 1

The Figure presents the time path of a fifteen days moving average for each of the loan characteristics, by robbed branches and control branches. The vertical line represents the dates of the robberies.

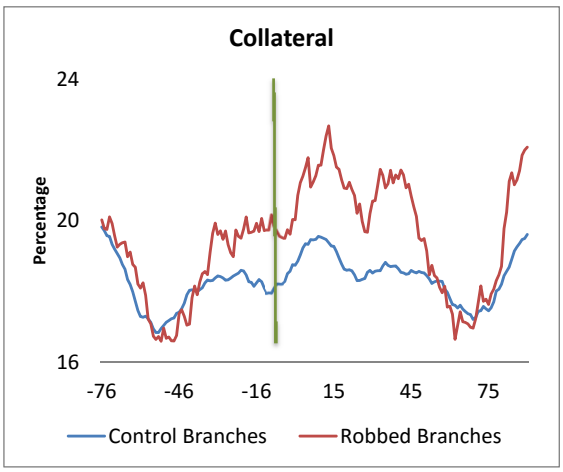
Panel A



Panel C



Panel B



Panel D

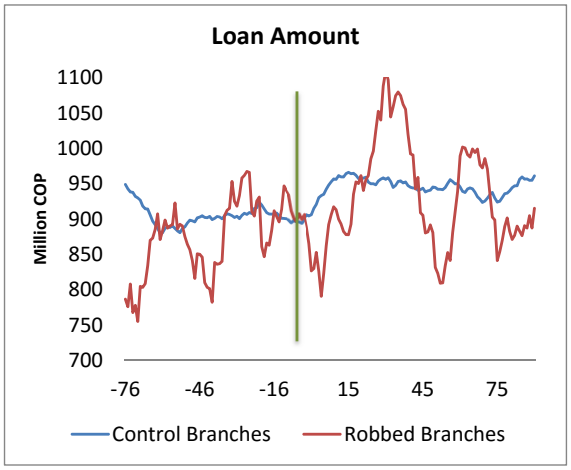


TABLE 1
The Registries Underlying the Sample Used in the Analysis

Variable		*Mean*	*Median*	*SD*
Register of Robberies (*National Police of Colombia*)				
Time Period	2003:01 - 2011:12			
Number of Robberies	835			
Amount Robbed, in US Dollars		*37,000*	*6,300*	*97,600*
Amount Robbed / Robbed Branch Deposits, in percent		*0.97*	*0.01*	*4.61*
Credit Registery (*Financial Superintendence of Colombia*)				
Time Period	1998:12 - 2010:12			
Number of Originated Loans	316,138			
Loan Amount, in US Dollars		*432,208*	*63,108*	*1,469,835*
Sample: Match of Registry of Robberies with Credit Registry				
Time Period	2003:01 - 2010:12			
Number of Robberies	389			
Amount Robbed, in US dollars		*19,980*	*4,995*	*54,718*
Amount Robbed / Robbed Branch Deposits, in percent		*0.02*	*0.00*	*0.12*
Number of Originated Loans	35,487			
Loan Amount, in US Dollars		*499,480*	*58,371*	*1,609,733*
Number of Branches in the rest of the country	1,649			
Number of Originated Loans	3,136,810			
Loan Amount, in US Dollars		*515,143*	*83,564*	*1,627,935*

NOTE. -- This table presents the registries underlying the sample used in the analysis, and the mean, median, and standard deviation (SD) statistics of selected variables. COP: Colombian Peso. In June 2011: 1,800 COP = 1 US Dollar or 1 Million COP = 555 US Dollars.

TABLE 2
Summary Statistics for Dependent and Independent Variables

Variable	Description	*Unit*	Mean	Median	SD	Min	Max
Dependent Variables: Loan Characteristics							
Maturity	Loan maturity	*Months*	8.7	3.0	16.5	0.0	341.0
Collateral	= 100 if loan is collateralized, = 0 otherwise	*100/0*	18.4	0.0	38.7	0.0	100.0
Collateralization	Collateral / Loan Amount	*%*	15.4	0.0	49.3	0.0	998.4
Interest Rate	Interest rate on the loan	*%*	17.5	16.2	7.8	0.4	38.0
Loan Amount	Loan size	*Million COP*	927.9	150.0	2,932.9	0.0	50,000.0
Independent Variables							
Robbery Characteristics							
Branch Robbed	= 1 if the bank branch is robbed, = 0 otherwise	*1/0*	0.0	0.0	0.1	0.0	1.0
After	= 1 in the period after the robbery, = 0 otherwise	*1/0*	0.5	1.0	0.5	0.0	1.0
ln(Days After the Robbery)	The logarithm of the number of days after the robbery	-	0.0	0.0	0.3	0.0	4.5
Firearm	= 1 if a firearm is present during the robbery, = 0 otherwise	*1/0*	0.9	1.0	0.2	0.0	1.0
Robbed Amount over Deposits	The ratio of the robbed amount and the deposits at the bank branch	*%*	0.03	0.00	0.13	0.00	1.49
Relationship Characteristics							
Length of Relationship	Length of the bank-firm relationship	*Quarters*	14.2	12.0	10.3	1.0	49.0
Main Bank	= 1 if loan granted by primary bank, = 0 otherwise	*1/0*	0.2	0.0	0.4	0.0	1.0
Firm Characteristics							
Small Firm	= 1 if small firm, = 0 otherwise	*1/0*	0.3	0.0	0.5	0.0	1.0
Age as borrower	Number of quarters since the firm obtained its first loan listed in the credit register	*Quarters*	26.8	27.0	10.7	1.0	49.0
Number of Relationships	Number of lenders of the firm	-	6.0	5.0	3.5	1.0	27.0
Default (t-1)	= 1 if firm defaulted on a loan during the previous year, = 0 otherwise	*1/0*	0.1	0.0	0.3	0.0	1.0
Firm Rating	Weighted quality of the loans of the firm (1 lowest, 5 highest)	*1-5*	4.9	5.0	0.3	1.0	5.0

NOTE. -- This table present the mean, median, standard deviation (SD), minimum (Min), and maximum (Max). The number of loan observations equals 3,172,297. COP: Colombian Peso. In June 2011: 1,800 COP = 1 US Dollar or 1 Million COP = 555 US Dollars.

TABLE 3
Differences in Means of Loan, Relationship and Firm Characteristics Between Robbed Branches and Branches in the Rest of the Country

	Robbed Branches		Branches in the Rest of the Country		Differences		Difference in Differences
Variable	**Before Bank Robbery**	**After Bank Robbery**	**Before Bank Robbery**	**After Bank Robbery**	**Before Bank Robbery**	**After Bank Robbery**	
Dependent Variables: Loan Characteristics							
Maturity	6.3	7.6	8.5	8.9	-2.2 ***	-1.3 ***	0.8 ***
Collateral	18.7	19.7	18.3	18.5	0.5	1.2 ***	0.7 *
Collateralization	17.8	18.2	15.1	15.6	2.7 ***	2.7 ***	-0.1
Interest Rate	18.1	17.3	17.6	17.3	0.5 ***	0.0	-0.5 ***
Ln(Loan Amount)	4.6	4.7	4.8	4.9	-0.2 ***	-0.1 ***	0.1
Independent Variables							
Relationship Characteristics							
Length of Relationship	15.3	16.3	13.9	14.5	1.4 ***	1.8 ***	0.3 ***
Main Bank	0.4	0.4	0.2	0.2	0.1 ***	0.1 ***	0.0 *
Firm Characteristics							
Small Firm	0.4	0.4	0.3	0.3	0.1 ***	0.1 ***	0.0
Age as Borrower	24.6	25.5	26.4	27.3	-1.8 ***	-1.8 ***	0.0
Number of Relationships	5.0	5.0	6.0	6.1	-1.0 ***	-1.1 ***	0.0
Default (t-1)	0.1	0.1	0.1	0.1	0.0 *	0.0	0.0
Firm Rating	4.9	4.9	4.9	4.9	0.0 ***	0.0 ***	0.0

NOTE. -- This table compares the means and medians of Loan, Relationship and Firm Characteristics between robbed and branches in the rest of the country, before and after the robberies using a t-test. The number of observations equals 3,172,297.

TABLE 4
Impact on Loan Terms After Bank Branch Robbery

Dependent Variables	Maturity					Collateral					Collateralization					Interest Rate					Loan Amount				
Models	I	II	III	IV	V	I	II	III	IV	V	I	II	III	IV	V	I	II	III	IV	V	I	II	III	IV	V
Branch Robbed * After	0.74***	3.27***	1.77	3.20***	1.40	0.42	3.35**	-23.55**	3.38**	-23.58**	-0.35	3.91**	-14.17**	4.11**	-13.17*	-0.339***	-0.297	2.719**	-0.291	2.785**	34.10*	37.83	-39.71	50.64	43.65
	(0.15)	(0.47)	(3.17)	(0.47)	(3.22)	(0.41)	(1.45)	(9.42)	(1.46)	(9.60)	(0.55)	(1.75)	(6.58)	(1.77)	(6.75)	(0.065)	(0.205)	(1.381)	(0.207)	(1.401)	(19.02)	(80.11)	(385.12)	(81.06)	(394.28)
Branch Robbed * After * ln(Days After the Robbery)		-0.70***	-0.15	-0.68***	-0.06		-0.81**	6.10**	-0.82**	6.09**		-1.17***	3.55*	-1.22***	3.31*		-0.011	-0.741*	-0.016	-0.768**		-1.02	13.83	-4.05	-7.04
		(0.12)	(0.84)	(0.12)	(0.85)		(0.37)	(2.59)	(0.38)	(2.64)		(0.45)	(1.91)	(0.45)	(1.95)		(0.055)	(0.382)	(0.055)	(0.387)		(21.93)	(106.71)	(22.16)	(109.11)
Branch Robbed * After * Firearm			1.53		1.83			27.37***		27.39***			18.39***		17.55**			-3.070**		-3.125**			79.03		7.20
			(3.20)		(3.25)			(9.59)		(9.74)			(6.84)		(6.95)			(1.412)		(1.430)			(393.20)		(400.83)
Branch Robbed * After * ln(Days After the Robbery) * Firearm			-0.56		-0.63			-7.02***		-7.01***			-4.80**		-4.60**			0.742*		0.764*			-15.13		3.02
			(0.85)		(0.86)			(2.63)		(2.68)			(1.97)		(1.99)			(0.390)		(0.395)			(109.01)		(111.02)
Branch Robbed * After * Robbed Amount over Deposits				0.02	0.02				-0.01	0.00				-0.05	-0.04				-0.002	-0.003				-3.11	-3.10
				(0.02)	(0.02)				(0.04)	(0.04)				(0.04)	(0.04)				(0.005)	(0.005)				(2.09)	(2.10)
Branch Robbed * After * ln(Days After the Robbery) * Robbed Amount over Deposits				-0.01	-0.01				0.00	-0.00				0.01	0.01				0.001	0.001				0.74	0.74
				(0.00)	(0.00)				(0.01)	(0.01)				(0.01)	(0.01)				(0.001)	(0.001)				(0.54)	(0.55)
Branch-Event Fixed Effects (150,699)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Before-Event Fixed Effects (389)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
After-Event Fixed Effects (389)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects (17)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Relationship and Firm Characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.10	0.10	0.10	0.11	0.11	0.10	0.10	0.10	0.10	0.10	0.08	0.08	0.08	0.08	0.08	0.42	0.42	0.42	0.42	0.42	0.11	0.11	0.11	0.11	0.11
Effect After a Bank Robbery	0.7 mths	3.2 mths	1.8 mths	3.2 mths	1.4 mths	0.4%	3.4%	-23.6%	3.4%	-23.6%	-0.4%	3.9%	-14.2%	4.1%	-13.2%	-0.3%	-0.3%	2.7%	-0.3%	2.8%	34.1 M	37.8 M	-39.7 M	50.6 M	43.7 M
Effect as a Percentage of Mean Dependent Variable	8.5%	37.6%	20.3%	36.8%	16.1%	2.3%	18.2%	-128.0%	18.4%	-128.2%	-2.3%	25.4%	-92.0%	26.7%	-85.5%	-2.0%	-1.7%	15.8%	-1.7%	16.2%	3.7%	4.1%	-4.3%	5.5%	4.7%
Half-Life of the Effect After a Bank Robbery		10 days	>90 days	10 days	>90 days		8 days	7 days	8 days	7 days		5 days	7 days	5 days	7 days		>90 days	6 days	>90 days	6 days		>90 days	4 days	515 days	22 days
Additional Effect After a Firearm Robbery			1.5 mths		1.8 mths			27.4%		27.4%			18.4%		17.6%			-3.1%		-3.1%			79M COP		7.2M COP
Half-Life of the Additional Effect After a Firearm Robbery			4 days		4 days			7 days		7 days			7 days		7 days			8 days		8 days			14 days		>90 days
Additional Effect of a 1 St. Dev. more on Robbed Amount over Deposits				0.0 mths	0.0 mths				0.0%	0.0%				-0.1%	0.0%				0.0%	0.0%				-3.1 M	-3.1 M

NOTE. -- The table assesses the impact of a bank branch robbery on the loan terms after the robbery and depending on the day the loan is granted, the intensity of the robbery and the amount robbed. The dependent variables are the maturity of the loan, whether or not the loan is collateralized, the degree of collateralization, the interest rate and the loan amount. Maturity is measured in months, Collateral, Collateralization and Interest Rate are in percent, and Loan Amount is in Million COP. All variables are defined in Table 2. The number of observations equals 3,172,297. Coefficients are listed in the first row, robust standard errors that are corrected for clustering at the firm level are reported in the row below in parentheses, and the corresponding significance levels are in the adjacent column. *** Significant at 1%, ** significant at 5%, * significant at 10%.

TABLE 5
Impact on Loan Performance After Bank Branch Robbery

Dependent Variables	**Arrear**		**Lenght of Arrear**	
Models	**I**	**II**	**I**	**II**
Branch Robbed * After	0.82***	0.97	0.019***	0.026
	(0.18)	(0.68)	(0.005)	(0.019)
Branch Robbed * After * ln(Days After the Robbery)		-0.04		-0.002
		(0.18)		(0.005)
Branch-Event Fixed Effects (150,699)	Yes	Yes	Yes	Yes
Before-Event Fixed Effects (389)	Yes	Yes	Yes	Yes
After-Event Fixed Effects (389)	Yes	Yes	Yes	Yes
Industry Fixed Effects (17)	Yes	Yes	Yes	Yes
Relationship and Firm Characteristics	Yes	Yes	Yes	Yes
Adjusted R-squared	0.03	0.03	0.03	0.03

NOTE. -- The table assesses the impact of a bank branch robbery on loan performance after the robbery and depending on the day the loan is granted. The dependent variables are the arrears and the length of arrears. Arrear is in percent, it takes the value of 100 if a loan had an arrear at any point of time during the sample period. Lengh of arrear is measured as the number of quarters in which a loan had an arrear. All other variables are defined in Table 2. The number of observations equals 3,172,297. Coefficients are listed in the first row, robust standard errors that are corrected for clustering at the firm level are reported in the row below in parentheses, and the corresponding significance levels are in the adjacent column. *** Significant at 1%, ** significant at 5%, * significant at 10%.

TABLE 6
Impact on Loan Terms After Bank Branch Robbery. Sample of Re-Visitations.

Dependent Variables	**Maturity**		**Collateral**		**Collateralization**		**Interest Rate**		**Loan Amount**	
Models	**I**	**II**	**I**	**II**	**I**	**II**	**I**	**II**	**I**	**II**
Branch Robbed * After	0.903***	6.600***	-0.26	7.40**	-1.42	7.62*	-0.584***	-1.478***	85.79**	979.41***
	(0.285)	(1.345)	(0.83)	(3.45)	(1.18)	(4.60)	(0.133)	(0.485)	(39.91)	(268.49)
Branch Robbed * After * ln(Days After the Robbery)		-1.546***		-2.08**		-2.45**		0.243*		-242.47***
		(0.344)		(0.90)		(1.17)		(0.128)		(68.17)
Branch-Event Fixed Effects (16,060)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Before-Event Fixed Effects (40)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
After-Event Fixed Effects (40)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects (17)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Relationship and Firm Characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.094	0.094	0.10	0.10	0.08	0.08	0.433	0.433	0.10	0.10

NOTE. -- The table assesses the impact of a bank branch robbery for a sample of re-visitations on the loan terms after the robbery and depending on the day the loan is granted, the intensity of the robbery and the amount robbed. The dependent variables are the maturity of the loan, whether or not the loan is collateralized, the degree of collateralization, the interest rate and the loan amount. Maturity is measured in months, Collateral, Collateralization and Interest Rate are in percent, and Loan Amount is in Million COP. All variables are defined in Table 2. The number of observations equals 340,401. Coefficients are listed in the first row, robust standard errors that are corrected for clustering at the firm level are reported in the row below in parentheses, and the corresponding significance levels are in the adjacent column. *** Significant at 1%, ** significant at 5%, * significant at 10%.

TABLE 7
Impact on the Number of Originated Loans After Bank Branch Robbery

Dependent Variables	**Number of loans**		
Models	**I**	**II**	**III**
Branch Robbed * After	-0.09**	-1.55***	-0.29
	(0.04)	(0.20)	(0.41)
Branch Robbed * After * ln(Days After the Robbery)		0.41***	0.04
		(0.05)	(0.11)
Branch Robbed * After * Firearm			-1.29***
			(0.46)
Branch Robbed * After * ln(Days After the Robbery) * Firearm			0.38***
			(0.12)
Branch-Event Fixed Effects (150,699)	Yes	Yes	Yes
Before-Event Fixed Effects (389)	Yes	Yes	Yes
After-Event Fixed Effects (389)	Yes	Yes	Yes
Adjusted R-squared	0.24	0.24	0.24

NOTE. -- The table assesses the impact of a bank branch robbery on the number of loans originated after the robbery. The dependent variable is the number of loans granted per day. All other variables are defined in Table 2. The number of observations equals 1,570,038. Coefficients are listed in the first row, robust standard errors that are corrected for clustering at the branch level are reported in the row below in parentheses, and the corresponding significance levels are in the adjacent column. *** Significant at 1%, ** significant at 5%, * significant at 10%.

TABLE 8
Impact on Lent Amount After Bank Branch Robbery.

Dependent Variables	**Lent Amount**			
Models	**I**	**II**	**III**	**IV**
Branch Robbed * After	6,107**	6,094**	6,040**	5,918*
	(3,035)	(3,036)	(3,029)	(3,0178)
Branch Robbed	105,534**	105,799**	-1,591	-1,445
	(45,585)	(45,784)	(6,733)	(6,578)
After	161***	174***	228***	351***
	(53)	(57)	(57)	(75)
Event Fixed Effects (389)	no	yes	no	yes
Branch Fixed Effects (2,375)	no	no	yes	yes
Adjusted R-squared	0.01	0.01	0.76	0.77

NOTE. -- The table assesses the impact of a bank branch robbery on the lent amount after the robbery. The dependent variable is the total amount of credit granted in the branch. All other variables are defined in Table 2. The number of observations equals 513,050. Coefficients are listed in the first row, robust standard errors that are corrected for clustering at the branch level are reported in the row below in parentheses, and the corresponding significance levels are in the adjacent column. *** Significant at 1%, ** significant at 5%, * significant at 10%.

APPENDIX TABLE A.1

Impact on Loan Terms After Bank Branch Robbery When Comparing to Other Branches in the Rest of the Region

Dependent Variables	Maturity					Collateral					Collateralization					Interest Rate					Loan Amount				
Models	I	II	III	IV	V	I	II	III	IV	V	I	II	III	IV	V	I	II	III	IV	V	I	II	III	IV	V
Branch Robbed * After	0.74***	3.27***	0.95	3.19***	0.48	0.43	3.31**	-24.85**	3.32**	-24.97**	-0.37	3.86**	-16.42**	4.04**	-15.53**	-0.360***	-0.327	2.243	-0.318	2.307	37.29*	54.50	51.75	66.51	131.32
	(0.16)	(0.48)	(3.38)	(0.48)	(3.44)	(0.43)	(1.47)	(9.94)	(1.48)	(10.12)	(0.59)	(1.78)	(7.34)	(1.80)	(7.52)	(0.071)	(0.209)	(1.432)	(0.211)	(1.452)	(21.18)	(82.61)	(404.66)	(83.31)	(414.28)
Branch Robbed * After * ln(Days After the Robbery)		-0.70***	0.16	-0.67***	0.28		-0.79**	6.73**	-0.80**	6.75**		-1.16***	4.41**	-1.21***	4.17**		-0.009	-0.666*	-0.014	-0.696*		-4.74	-51.30	-7.66	-72.54
		(0.12)	(0.87)	(0.12)	(0.88)		(0.38)	(2.68)	(0.38)	(2.73)		(0.45)	(2.03)	(0.46)	(2.07)		(0.055)	(0.390)	(0.056)	(0.396)		(22.34)	(108.76)	(22.53)	(111.17)
Branch Robbed * After * Firearm			2.36		2.75			28.63***		28.72***			20.61***		19.86***			-2.612*		-2.664*			3.09		-65.57
			(3.42)		(3.47)			(10.10)		(10.26)			(7.57)		(7.71)			(1.461)		(1.479)			(412.79)		(421.25)
Branch Robbed * After * ln(Days After the Robbery) * Firearm			-0.88		-0.97			-7.65***		-7.66***			-5.67***		-5.46***			0.668*		0.692*			47.26		65.80
			(0.88)		(0.89)			(2.72)		(2.77)			(2.09)		(2.11)			(0.398)		(0.403)			(110.97)		(113.05)
Branch Robbed * After * Robbed Amount over Deposits				0.02	0.02				-0.00	0.01				-0.05	-0.04				-0.002	-0.003				-2.96	-2.97
				(0.02)	(0.02)				(0.04)	(0.04)				(0.04)	(0.04)				(0.005)	(0.005)				(2.12)	(2.13)
Branch Robbed * After * ln(Days After the Robbery) * Robbed Amount over Deposits				-0.01*	-0.01*				0.00	-0.00				0.01	0.01				0.001	0.001				0.71	0.73
				(0.00)	(0.00)				(0.01)	(0.01)				(0.01)	(0.01)				(0.001)	(0.001)				(0.55)	(0.55)
Branch-Event Fixed Effects (55,533)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Before-Event Fixed Effects (372)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
After-Event Fixed Effects (372)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects (17)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Relationship and Firm Characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.11	0.11	0.11	0.11	0.11	0.10	0.10	0.10	0.10	0.10	0.08	0.08	0.08	0.08	0.08	0.43	0.43	0.43	0.43	0.43	0.11	0.11	0.11	0.11	0.11

NOTE. -- The table assesses the impact of a bank branch robbery on the loan terms after the robbery and depending on the day the loan is granted, the intensity of the robbery and the amount robbed. The dependent variables are the maturity of the loan, whether or not the loan is collateralized, the degree of collateralization, the interest rate and the loan amount. Maturity is measured in months, Collateral, Collateralization and Interest Rate are in percent, and Loan Amount is in Million COP. All variables are defined in Table 2. The number of observations equals 953,861. Coefficients are listed in the first row, robust standard errors that are corrected for clustering at the firm level are reported in the row below in parentheses, and the corresponding significance levels are in the adjacent column. *** Significant at 1%, ** significant at 5%, * significant at 10%.

APPENDIX TABLE A.2
Impact on Loan Terms After Bank Branch Robbery with Loan Characteristics Included as Controls.

Dependent Variables (Mean and Units)	**Maturity** (8.7 Months)					**Collateral** (18.4%)					**Collateralization** (15.4%)					**Interest Rate** (17.2%)					**Loan Amount** (928 Million COP)				
Models	**I**	**II**	**III**	**IV**	**V**	**I**	**II**	**III**	**IV**	**V**	**I**	**II**	**V**	**VI**	**VII**	**I**	**II**	**III**	**IV**	**V**	**I**	**II**	**III**	**IV**	**V**
Branch Robbed * After	0.634***	2.910***	4.379	2.832***	4.012	-0.13	1.58	-22.64***	1.67	-22.37**	-0.84	2.36	-13.23**	2.61	-11.94*	-0.297***	-0.133	2.329*	-0.123	2.416*	3.76	15.56	59.25	29.49	149.46
	(0.142)	(0.459)	(2.750)	(0.463)	(2.790)	(0.39)	(1.39)	(8.58)	(1.41)	(8.75)	(0.53)	(1.71)	(6.21)	(1.73)	(6.38)	(0.063)	(0.200)	(1.334)	(0.202)	(1.355)	(19.22)	(78.36)	(382.51)	(79.27)	(392.41)
Branch Robbed * After * ln(Days After the Robbery)		-0.626***	-0.830	-0.605***	-0.742		-0.47	5.69**	-0.50	5.60**		-0.88**	3.15*	-0.94**	2.83		-0.045	-0.630*	-0.050	-0.663*		-3.25	-16.40	-6.79	-39.95
		(0.117)	(0.724)	(0.118)	(0.734)		(0.36)	(2.36)	(0.36)	(2.41)		(0.44)	(1.78)	(0.44)	(1.82)		(0.054)	(0.369)	(0.054)	(0.375)		(21.51)	(106.27)	(21.73)	(108.93)
Branch Robbed * After * Firearm			-1.499		-1.203			24.65***		24.41***			15.86**		14.77**			-2.506*		-2.579*			-44.40		-121.80
			(2.790)		(2.826)			(8.76)		(8.90)			(6.47)		(6.59)			(1.363)		(1.382)			(389.99)		(398.44)
Branch Robbed * After * ln(Days After the Robbery) * Firearm			0.208		0.140			-6.26***		-6.19**			-4.10**		-3.84**			0.595		0.622			13.37		33.66
			(0.734)		(0.742)			(2.40)		(2.44)			(1.84)		(1.87)			(0.377)		(0.382)			(108.47)		(110.74)
Branch Robbed * After * Robbed Amount over Deposits				0.019	0.019				-0.02	-0.01				-0.06	-0.06				-0.003	-0.004				-3.38*	-3.42*
				(0.013)	(0.013)				(0.04)	(0.04)				(0.04)	(0.04)				(0.005)	(0.005)				(2.05)	(2.06)
Branch Robbed * After * ln(Days After the Robbery) * Robbed Amount over Dep				-0.005*	-0.005*				0.01	0.00				0.02	0.01				0.001	0.001				0.85	0.87
				(0.003)	(0.003)				(0.01)	(0.01)				(0.01)	(0.01)				(0.001)	(0.001)				(0.53)	(0.54)
Branch-Event Fixed Effects (150,699)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Before-Event Fixed Effects (389)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
After-Event Fixed Effects (389)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects (17)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Relationship and Firm Characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Loan Characteristics	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
Adjusted R-squared	0.15	0.15	0.15	0.15	0.15	0.16	0.16	0.16	0.16	0.16	0.11	0.11	0.11	0.11	0.11	0.45	0.45	0.45	0.45	0.45	0.14	0.14	0.14	0.14	0.14

NOTE. -- The table assesses the impact of a bank branch robbery on the loan terms after the robbery and depending on the day the loan is granted, the intensity of the robbery and the amount robbed, and with other loan Characteristics included as controls. The dependent variables are the maturity of the loan, whether or not the loan is collateralized, the degree of collateralization, the interest rate and the loan amount. Maturity is measured in months, Collateral, Collateralization and Interest Rate are in percent, and Loan Amount is in Million COP. All variables are defined in Table 2. The number of observations equals 3,172,297. Coefficients are listed in the first row, robust standard errors that are corrected for clustering at the firm level are reported in the row below in parentheses, and the corresponding significance levels are in the adjacent column. *** Significant at 1%, ** significant at 5%, * significant at 10%.

APPENDIX TABLE A.3

Impact on Loan Terms After Bank Branch Robbery in Branches that were Robbed Only Once.

Dependent Variables	Maturity					Collateral					Collateralization					Interest Rate					Loan Amount				
Models	I	II	III	IV	V	I	II	III	IV	V	I	II	III	IV	V	I	II	III	IV	V	I	II	III	IV	V
Branch Robbed * After	0.675***	2.801***	1.628	2.687***	1.183	0.34	2.78*	-23.82**	2.80*	-23.97**	-0.42	3.12*	-14.40**	3.36*	-13.54**	-0.281***	-0.285	2.557*	-0.280	2.601*	20.60	-145.42	-9.48	-132.14	60.55
	(0.139)	(0.504)	(3.167)	(0.510)	(3.219)	(0.42)	(1.65)	(9.48)	(1.68)	(9.66)	(0.53)	(1.86)	(6.63)	(1.89)	(6.79)	(0.060)	(0.230)	(1.385)	(0.232)	(1.403)	(20.30)	(92.47)	(387.08)	(93.54)	(395.77)
Branch Robbed * After * ln(Days After the Robbery)		-0.587***	-0.101	-0.556***	0.006		-0.67	6.20**	-0.68	6.23**		-0.98**	3.64*	-1.03**	3.43*		0.001	-0.688*	-0.003	-0.709*		45.85*	3.30	42.75	-14.17
		(0.131)	(0.837)	(0.132)	(0.849)		(0.43)	(2.61)	(0.43)	(2.66)		(0.48)	(1.92)	(0.49)	(1.96)		(0.061)	(0.384)	(0.062)	(0.389)		(25.74)	(107.29)	(26.05)	(109.58)
Branch Robbed * After * Firearm			1.196		1.531			27.24***		27.35***			17.94***		17.26**			-2.912**		-2.945**			-138.99		-196.70
			(3.207)		(3.254)			(9.70)		(9.85)			(6.92)		(7.03)			(1.420)		(1.436)			(396.88)		(403.98)
Branch Robbed * After * ln(Days After the Robbery) * Firearm			-0.496		-0.574			-7.04***		-7.06***			-4.72**		-4.56**			0.705*		0.721*			43.51		58.10
			(0.848)		(0.859)			(2.66)		(2.70)			(1.99)		(2.01)			(0.393)		(0.397)			(110.19)		(112.03)
Branch Robbed * After * Robbed Amount over Deposits				0.022	0.022				-0.00	0.01				-0.04	-0.04				-0.001	-0.002				-2.45	-2.51
				(0.015)	(0.015)				(0.04)	(0.04)				(0.04)	(0.04)				(0.005)	(0.005)				(2.05)	(2.06)
Branch Robbed * After * ln(Days After the Robbery) * Robbed Amount over Deposits				-0.006*	-0.006*				0.00	-0.00				0.01	0.01				0.001	0.001				0.58	0.59
				(0.003)	(0.003)				(0.01)	(0.01)				(0.01)	(0.01)				(0.001)	(0.001)				(0.54)	(0.54)
Branch-Event Fixed Effects (123,645)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Before-Event Fixed Effects (318)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
After-Event Fixed Effects (318)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects (17)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Relationship and Firm Characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.105	0.105	0.105	0.105	0.105	0.10	0.10	0.10	0.10	0.10	0.08	0.08	0.08	0.08	0.08	0.406	0.406	0.406	0.406	0.406	0.11	0.11	0.11	0.11	0.11

NOTE. -- The table assesses the impact of a bank branch robbery in branches that were robbed only once on the loan terms after the robbery and depending on the day the loan is granted, the intensity of the robbery and the amount robbed. The dependent variables are the maturity of the loan, whether or not the loan is collateralized, the degree of collateralization, the interest rate and the loan amount. Maturity is measured in months, Collateral, Collateralization and Interest Rate are in percent, and Loan Amount is in Million COP. All variables are defined in Table 2. The number of observations equals 2,617,670. Coefficients are listed in the first row, robust standard errors that are corrected for clustering at the firm level are reported in the row below in parentheses, and the corresponding significance levels are in the adjacent column. *** Significant at 1%, ** significant at 5%, * significant at 10%.

APPENDIX TABLE A.4
Impact on Loan Terms After Bank Branch Robbery. Interactions with Length of Relationship

Dependent Variables (Mean and Units)	**Maturity** (8.7 Months)		**Collateral** (18.4%)		**Interest Rate** (17.2%)		**Loan Amount** (928 Million COP)	
Models	**I**	**II**	**I**	**II**	**I**	**II**	**I**	**II**
Branch Robbed * After	0.229	4.143***	-1.25	3.58	-0.096	-0.375	26.93	301.32*
	(0.263)	(0.940)	(0.83)	(2.67)	(0.141)	(0.426)	(79.83)	(173.94)
Branch Robbed * After * ln(Days After the Robbery)		-1.080***		-1.33*		0.077		-75.58*
		(0.241)		(0.70)		(0.111)		(45.02)
Branch Robbed * After * Length of Relationship	0.032**	-0.051	0.10**	-0.01	-0.015*	0.004	0.44	-15.78
	(0.014)	(0.048)	(0.04)	(0.14)	(0.008)	(0.022)	(5.05)	(10.84)
Branch Robbed * After * ln(Days After the Robbery) * Length of Relationship		0.023*		0.03		-0.005		4.46
		(0.012)		(0.04)		(0.006)		(2.80)
Branch-Event Fixed Effects (150,699)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Before-Event Fixed Effects (389)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
After-Event Fixed Effects (389)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects (17)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Relationship and Firm Characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.10	0.10	0.10	0.10	0.42	0.42	0.11	0.11

NOTE. -- The table assesses the impact of a bank branch robbery on the loan terms after the robbery and depending on the day the loan is granted, the intensity of the robbery and the amount robbed, when interactions with the length of the relationship are included. The dependent variables are the maturity of the loan, whether or not the loan is collateralized, the degree of collateralization, the interest rate and the loan amount. Maturity is measured in months, Collateral, Collateralization and Interest Rate are in percent, and Loan Amount is in Million COP. All variables are defined in Table 2. The number of observations equals 3,172,297. Coefficients are listed in the first row, robust standard errors that are corrected for clustering at the firm level are reported in the row below in parentheses, and the corresponding significance levels are in the adjacent column. *** Significant at 1%, ** significant at 5%, * significant at 10%.

APPENDIX TABLE A.5

Impact on Loan Terms After Bank Branch Robbery in all the Branches in the Region (excluding the Municipality) of the Affected Bank

Dependent Variables	Maturity					Collateral					Collateralization					Interest Rate					Loan Amount				
Models	I	II	III	IV	V	I	II	III	IV	V	I	II	III	IV	V	I	II	III	IV	V	I	II	III	IV	V
Branch Robbed * After	0.33***	0.98***	1.66	0.92***	2.63	0.09	1.45*	-0.42	0.94	1.22	-0.01	2.95**	-0.33	1.64	-3.99	-0.196***	0.057	0.414	0.088	1.461*	-12.20	-67.32	-222.51	-60.25	-530.76*
	(0.11)	(0.28)	(1.44)	(0.29)	(2.16)	(0.24)	(0.76)	(3.92)	(0.78)	(5.25)	(0.36)	(1.26)	-4.49	-1.31	-7.96	(0.046)	(0.130)	(0.442)	(0.137)	(0.839)	(21.22)	(59.28)	(184.65)	(62.22)	(273.18)
Branch Robbed * After * ln(Days After the Robbery)		-0.18**	-0.59	-0.17**	-1.15**		-0.38*	-0.47	-0.19	-1.29		-0.83**	0.49	-0.5	1.47		-0.071**	0.218*	-0.101***	-0.333		15.52	34.92	14.33	102.26
		(0.08)	(0.40)	(0.08)	(0.57)		(0.20)	(1.07)	(0.21)	(1.44)		(0.34)	-1.24	-0.35	-2.32		(0.035)	(0.121)	(0.037)	(0.234)		(16.58)	(52.13)	(17.37)	(83.27)
Branch Robbed * After * Firearm			-0.70		-1.73			1.97		-0.27			3.41		5.74			-0.387		-1.401*			162.69		479.93*
			(1.48)		(2.19)			(4.01)		(5.32)			(4.69)		(8.09)			(0.463)		(0.851)			(197.51)		(278.66)
Branch Robbed * After * ln(Days After the Robbery) * Firearm			0.43		0.99*			0.09		1.11			-1.37		-2.00			-0.298**		0.238			-20.41		-89.77
			(0.41)		(0.58)			(1.09)		(1.46)			(1.30)		(2.36)			(0.127)		(0.237)			(54.59)		(83.54)
Branch Robbed * After * Robbed Amount over Deposits				0.002	0.00				0.02***	0.02***				0.05***	0.05***				-0.001	-0.001				-0.37*	-0.36*
				(0.002)	(0.00)				(0.01)	(0.01)				(0.02)	(0.02)				(0.002)	(0.002)				(0.21)	(0.21)
Branch Robbed * After * ln(Days After the Robbery) * Robbed Amount over Deposits				-0.001*	-0.00*				-0.01***	-0.01***				-0.01***	-0.01***				0.001	0.001				0.08	0.08
				(0.000)	(0.00)				(0.00)	(0.00)				(0.00)	(0.00)				(0.000)	(0.000)				(0.06)	(0.06)
Branch-Event Fixed Effects (137,456)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Before-Event Fixed Effects (369)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
After-Event Fixed Effects (369)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects (17)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Relationship and Firm Characteristics	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.08	0.08	0.08	0.08	0.08	0.42	0.42	0.42	0.42	0.42	0.11	0.11	0.11	0.11	0.11

NOTE. -- The table assesses the impact of a bank branch robbery on the loan terms after the robbery in all the branches in the region (excluding the municipality) of the affected bank and depending on the day the loan is granted, the intensity of the robbery and the amount robbed. The dependent variables are the maturity of the loan, whether or not the loan is collateralized, the degree of collateralization, the interest rate and the loan amount. Maturity is measured in months, Collateral, Collateralization and Interest Rate are in percent, and Loan Amount is in Million COP. All variables are defined in Table 2. The number of observations equals 2,935,100. Coefficients are listed in the first row, robust standard errors that are corrected for clustering at the firm level are reported in the row below in parentheses, and the corresponding significance levels are in the adjacent column. *** Significant at 1%, ** significant at 5%, * significant at 10%.

Firms' Strategic Choice of Loan Delinquencies

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Firms' Strategic Choice of Loan Delinquencies

Abstract

I analyze the repayment decisions of firms with multiple loans that, for liquidity constraints or strategic reasons, stop making payments in some but not all their loans. Using a sample of commercial loans from Colombia over the period 2002:03 – 2012:06, I find that firms are less likely to stop making payments on loans granted by banks with which they have long relationships and by banks with which they have a clean repayment history. These results suggest that firms are concerned with losing the benefits gained through the relationship. I also find that firms are more likely to stop making payments on loans from foreign banks when compared to domestic banks, and equally on loans from state owned banks when compared to private banks. This suggests that the ability and willingness of the bank to punish the firm for misbehaving play an important role in a firm's decision. Overall, the results suggest that firms assess their delinquency choices based on their perceived ability to obtain new loans in the future.

JEL Codes: G21, G32, G33

Key words: Payment delinquencies, strategic choice, lending relationship, foreign ownership, state banks.

I. INTRODUCTION

Corporate finance literature has often analyzed the main causes of debt defaults. A liquidity default occurs when a firm does not have the money to make debt payments. However, a strategic default occurs when the firm despite having the financial ability to cover its debt obligations decides to stop making payments[1]. The literature has mainly focused on finding the optimal debt structure of a firm, *ex ante* liquidity constraints, that deters strategic defaults and makes unavoidable liquidity defaults less expensive (Hart and Moore (1998), Bolton and Scharfstein (1990, 1996), Acharya, Huang, Subrahmanyam and Sundaram (2011)). However, the optimal decision of a firm *ex post* unavoidable liquidity constraints have been left unexplored. For instance, no research has attempted to analyze the trade-offs of a firm when deciding which type of debt to delinquent on.

In this paper, I empirically analyze the delinquency decisions of firms with multiple loans that, due to liquidity constraints or strategic reasons, stop making payments in some but not all their loans. The decision on which type of loan to stop making payments is important as it might have asymmetric influences on the ability of the firm to obtain new credit in the future. Understanding this decision and its main drivers helps to shed light on the trade-offs faced by a firm when its cash flows are not enough to cover all of its debt payments. I focus my analysis on three aspects that can influence the delinquency choice of a firm: i) the strength of the relationship between the firm and the bank, ii) the ability and willingness of the bank to punish the firm for misbehaving and iii) the likelihood that a loan will end up in a renegotiation process. A unique dataset with detailed information on all commercial loans granted in Colombia from 1998 to 2012 is used in this analysis. The set of observable characteristics includes: collateral, loan amount, maturity, interest rate, currency and loan rating. This loan data is merged with the firms' financial statements as well as with bank characteristics. This provides a rich

[1] Strategic defaults of big corporations are often associated with agency problems between managers and

data set ideal to analyze the choice of arrears of a firm. In addition, Colombia is a country in which rating agencies do not monitor firms and therefore there are large information asymmetries between firms and potential public investors. As a result, less than just 0.9 percent of total firms have public debt and the predominant source of financing is bank credit. Thus, relationship lending should be particularly important in Colombia.

My empirical strategy consists of two steps. First, I isolate a group of firms with multiple loans that is forced to stop making payments on some of its bank debt obligations. I do so by selecting firms that have all their loan payments up to date in a given quarter t, but who start having payment delinquencies[2] on some of their loans, but not in all of them, in the following quarter, $t + 1$. Firms that are forced to stop all their loan payments are excluded, as they do not face the decision on which loan to stop making payments. Similarly, firms that manage to make all their loan payments are not included. The selected sample is comprised off firms that face heterogeneous liquidity shocks in terms of origin[3], timing and magnitude. Nonetheless, the outcome of the shocks is homogeneous as they evaluate a common set of decisions. This helps me to assess what the primary factors impacting firm delinquency decision are, in isolation of other concerns.

Next, the main drivers of the delinquency choice are obtained from a linear probability model in which the dependent variable is an indicator variable for loan delinquency. This variable takes the value of 1 for the loans that the firm chooses to stop making payments and 0 otherwise. There are several potential reasons why a firm would prefer to stop making payments on one loan instead of another one. I focus my analysis on a diverse set of variables that include type of relationship, type of bank and loan characteristics. In addition, and crucial for my identification strategy, I include a set of firm-time fixed effects in order to account for any observable and unobservable firm, time and firm-time heterogeneity. Thus, identification comes from a firm's choice to stop making payments on one loan versus another.

[2] In this paper "payment delinquency" and "arrear" make reference to stop making payments on a loan.
[3] The origin might be linked to limited liquidity and/or strategic reasons.

I find that firms are less likely to stop making payments on loans granted by banks with which they have long relationships, suggesting that firms are concerned with losing the benefits gained through the relationship. For the average relationship (9.6 quarters), the likelihood to start an arrear in a loan decreases by 2.2 percentage points. This effect as a percentage of the mean likelihood is equal to 9.6%. I further test if a variation on the value of bank-firms relationships (provided by a change in regulation that modified the memory of the credit bureaus[4]) has an effect on this result. I find that firms are even less likely to stop making payments on long relationships when the value of the relationship increases (i.e. when there is more asymmetric of information in the credit market). In addition, I find that firms that had arrears in the past are more likely to stop making payments on loans granted by banks victims of their previous arrears (the likelihood increases by 10.1 percentage points) and are less likely to choose to stop making payments on loans with banks that have not experienced any of their previous arrears (the likelihood decreases by 10.7 percentage points). This suggests that firms strategically keep clean records with some banks.

I also find that firms are more likely to stop making payments on loans granted by foreign banks when compared to domestic banks (the likelihood increases by 1.4 percentage points), and equally on loans granted by state owned banks when compared to private banks (the likelihood increases by 6.2 percentage points). In robustness, however, I show that firms are more likely to stop making on loans granted by foreign banks when the bank enter the market as a Greenfield Investment. These results suggest that the ability and willingness of the bank to punish the firm for misbehaving play a role in the firm's decision. This is in line with previous empirical findings that suggest that compared to domestic banks foreign banks generally face informational disadvantages that can affect their ability to succeed at recovering defaults (Mian (2006)). Furthermore, state owned banks are less active in monitoring and punishing their clients. This is due to the fact that they maximize social objectives instead of profits, and are considered to be inefficient compared to private banks (Gerschenkron (1962), Banerjee (1997), Hart, Shleifer and Vishny (1997)).

[4] Refers to the Habeas data law.

Finally, I find that firms seem more likely to stop making payments on loans that are prone to end up in renegotiation process. Three main results stand out. Firms are more likely to stop making payments: i) on collateralized loans (that give the bank more certainty that the firm will repay), ii) on larger loans (that give the bank more motivation to start a renegotiation process) and iii) on loans that still have a relatively long time until maturity (that provide more time for renegotiation).

In order to understand whether the selection of loan delinquencies is linked to the ex post availability and cost of credit, I analyze the benefits of bank-firm relationships and the cost of past loan delinquencies in terms of the loan conditions of new loans. I find that as the relationship lengthens firms get loans with lower interest rates, lower collateral requirements and higher loan amounts. This is consistent with previous theory and empirical findings according to which banks gain private information about the prospects of a firm during the relationship, and based on this they decide whether to extend more credit and/or change the loan terms (e.g., Petersen and Rajan (1995), Boot and Thakor (1994), Berger and Udell (1995)). On the contrary, it provides evidence against theories of 'hold up' problem according to which borrowers become locked in to their banks as the relationship matures and banks extract monopoly rents (e.g., Sharpe (1990), Rajan (1992)). Nonetheless, this result might be associated to the existence of multiple relationships in Colombia[5]. As according to Sharpe (1990) and Rajan (1992) the competition from an additional informed bank eliminates the "hold-up" costs. In addition, this exercise provides evidence that firms with previous arrears get loans with higher interest rates, higher collateral requirements and lower loan amounts; in particular when the previous arrears where with the bank granting the new loan. This is consistent with previous empirical findings that suggest banks write tighter loan contracts than their peers after suffering payment defaults to their own loan portfolio (Murfin (2006)).

[5] In the Colombia the average number of bank –firm relationships is 3 and the maximum 23. The distribution of the number of bank relationships per firm varies a lot across countries. With Italy and Norway in opposite extremes. While in Italy on average firms have 15 relationships, in Norway no firm has more than 6 relationships.

To the best of my knowledge, this paper is the first to analyze the payment delinquency choice for firms. Other work has studied this question for households taking into account relevant aspects for them. Cohen-Cole and Morse (2010) analyze a sample of individuals that experience a liquidity shock and are forced to stop making payments in at least one of their loans[6]. They find that due to precautionary liquidity concerns, individuals prefer to default on mortgage loans than on credit cards. Trautmann and Vlahu (2012) find experimentally that expectations that the bank will become distressed reduce the repayment incentive for solvent borrowers, because the benefits of the relationship are lost if the bank fails. Guiso, Sapienza and Zingales (2013) study the determinants of homeowners' attitudes towards strategic default. They find that the cost of defaulting strategically increases with wealth and that it is driven by monetary and non-monetary factors like fairness and morality. They also find that people who know somebody who defaulted strategically are more willing to do so themselves, due to a decrease in the perceived probability that a bank would go after a borrower who defaults.

This paper contributes to the literature by analyzing how firms with multiple loans react when they are forced to stop making payments on one or more of their loans. An empirical analysis of this particular aspect of firms' decision making in periods of financial distress is new to the literature. Importantly, in the strategic choice of delinquencies, the analysis takes into account certain aspects of the lender-borrower relationship, the type of bank and the loan characteristics, and it is able to identify the trade-offs faced by a firm when deciding which type of loans to delinquent on.

The rest of the paper proceeds as follows. Section II provides a review of the related theoretical and empirical literature. Section III presents the hypothesis and the methodology. Section IV describes the data and provides descriptive statistics. Section V contains the empirical results, including tests for robustness. Conclusions and a brief summary of future work follow in Section VI.

[6] My empirical strategy follows closely the approach taken by Cohen-Cole and Morse.

II. LITERATURE REVIEW

The corporate finance literature has studied the optimal debt structure of a firm, *ex ante* liquidity constraints, that deters strategic defaults and makes unavoidable liquidity defaults less expensive. Bolton and Scharfstein (1996), for instance, analyze what is the optimal debt structure of a firm, in terms of number of lenders, allocation of security interests and voting rules. The key to their analysis is the idea that these aspects of the debt structure affect the outcome of debt renegotiation following a default. They, however, do not take into consideration that the characteristics of the lender and/or the relationship between the firm and the lender might also affect the outcome of debt renegotiation. According to their findings it is optimal for firms with low credit quality to borrow from just one creditor, making the liquidation cost cheap. And it is optimal for firms with high credit quality to have debt structures that make strategic default less attractive by borrowing from multiple creditors, by giving each equal security interests, and by adopting voting rules that allow some creditors to block asset sales. However, to the best of my knowledge, there are no theoretical studies that analyze the optimal decision of a firm, *ex post* unavoidable liquidity constraints, regarding which loans to pay and which loans to delinquent on.

Recent empirical studies have analyzed several aspects of delinquency decisions, however, they have focused mostly on households.[7] Cohen-Cole and Morse (2010) analyze the drivers of delinquency decisions using a sample of US consumer loans from 2006 to 2007. Their analysis is focused on individuals that experience a liquidity shock which force them to stop making payments on at least one loan. These individuals face the decision to choose the type of debt they wish to keep and the type of debt on which they wish to enter delinquency. They find that individual liquidity considerations and local housing prices are significant predictors of the delinquency decision for individuals

[7] An exception is a recent paper by Baele, Farooq and Ongena (2014). Using a monthly dataset of business loans from Pakistan over the period 2006 to 2008, they analyze the effect of religion on the loan default rate. They find evidence that the default rate of Islamic loans is less than half the default rate of conventional loans. Islamic loans are less likely to default during Ramadan and in big cities if the share of votes to religious-political parties increases. Their findings suggest that individual religious belief and/or those of their fellow believers affect the decisions on loan defaults.

under moderate stress. Moreover, they find that due to precautionary liquidity concerns, individuals prefer to default on mortgage loans than on credit cards. Trautmann and Vlahu (2012), experimentally study the impact of bank and borrower fundamentals on loan repayment. They find that solvent borrowers are more likely to strategically delay or even default on their loans when the bank's expected strength is low and when other borrowers' expected repayment capacity is low. The authors argue that the repayment incentives are reduced because the benefits of maintaining the relationship are lost if the bank fails. Another branch of the literature investigates non-monetary factors that affect the default decision. Guiso, Sapienza and Zingales (2013) use a survey made of US households during the period 2008 to 2010 to study the determinants of homeowners' attitudes towards strategic default. They find that the cost of defaulting strategically increases with wealth and that it is driven by monetary and non-monetary factors like fairness and morality. People who are angrier about the economic situation and who distrust banks are more likely to default strategically. While people who consider it immoral to default are less willing to default. They also find that people who know somebody who defaulted strategically are more willing to do so themselves, due to a decrease in the perceived probability that the bank will go after a borrower who defaults.

In this paper I study the decisions of firms that for liquidity constraints or strategic reasons are forced to stop making payments in some of their loans. The analysis focuses in understanding why a firm would prefer to delinquent on one loan instead of another one. It follows closely the approach taken by Cohen-Cole and Morse (2010), however, instead of focused on a period of global financial distress, I take advantage of the richness of my dataset by selecting all the periods in which a firm faced this type of decision. In addition, I focus on loan delinquencies rather than on permanent defaults. This is important, as the life of a firm is likely to continue after a loan delinquency such that the future availability of financial resources should play an important role in a firm's decisions. Loan delinquencies typically have a cost for a firm in terms of future financial constraints and this cost can vary across lenders depending on the relationship and/or bank specific characteristics. Therefore, the firm's decision in regards to which loan to delinquent on, should take this cost into account. However, as the firm approaches a

permanent default, considerations around the cost of liquidation should start to play a more important role as in Bolton and Scharfstein (1996).

This paper aims to contribute to the current literature by providing an empirical analysis of a firms' decision-making process in periods of financial distress. It is the first paper that studies how firms react when they are forced to delinquent on some of their loans. Importantly, the analysis takes into account aspects of the relationship, the bank and the loan characteristics that were not taken into account before in the literature of strategic choice of defaults.

III. HYPOTHESIS AND METHODOLOGY

This paper, as discussed, aims to understand the decision making of firms that due to liquidity constraints or strategic reasons are forced to stop making payments in some of their loans. The analysis is focused on firms that have made all its loan payments up to date on quarter t, but delinquent on some of their loans, but not in all of them, in quarter $t+1$. Firms that are forced to stop all their loan payments, are excluded, as they do not face a decision as to which loan to stop making payments on. Similarly, firms that manage to make all its loan payments are also not included.

Although each firm included in the analysis is likely to experience a liquidity shock[8] with a different intensity, the decision faced by each of them is the same: Which loan do I delinquent on? The decision might be driven by several reasons that aim to favor the current and/or future financial conditions of a firm. Among those reasons are: the strength of the relationship with the bank, the ability and willingness of the bank to punish the firm for misbehaving, and the likelihood that a loan could be driven into a renegotiation process.

In order to identify what the main drivers of the delinquency choice are, I estimate the following linear probability model:

[8] The liquidity shock is experience as a result of liquidity constraints or strategic decisions of the firm.

$$1\{Delinquency_{ijkt}\} = \gamma\ Relationship_{ijt} + \beta\ Bank_{jk} + \alpha\ Loan_{ijkt} + \theta_{it} + \varepsilon_{ijkt} \quad (1)$$

where i, j, k and t index firm, bank, loan and time (in quarters) respectively. θ_{it} corresponds to firm-time fixed effects. They capture any systematic differences across firms for each quarter. The specifications saturated with firm-time fixed effects rule out the possibility that observed and/or unobserved firm, time and/or firm-time heterogeneity explain the decision as to which loan to stop making payments on. Thus, identification comes from a firm's choice to stop making payments on one loan versus another. The standard errors are clustered at firm level to account for correlations in the residuals across observations of the same firm.

$Delinquency_{ijkt}$ is equal to 1 if the loan is delinquent and is equal to 0 otherwise. Among the relationship characteristics I include: $Length\ of\ Relationship_{ijt}$, which is the length in quarters of the relationship between firm i and bank j at time t. $Previous\ Delinquencies\ same\ Bank_{ijt}$, which is an indicator variable that equals 1 if firm i has been delinquent only on loans granted by bank j before time t and equals 0 otherwise. $Previous\ Delinquencies\ other\ Bank_{ijt}$ which is an indicator variable that equals 1 if firm i has been delinquent only on loans granted by banks different to j before time t and equals 0 otherwise. $Number\ of\ Loans_{ijt}$ which is the number of loans that firm i has with bank j and $Share\ of\ Wallet_{ijt}$ which is the proportion of bank debt that firm i has with the bank j at time t. Within the bank characteristics I include $Foreign_{jk}$, which indicates whether the bank j that granted loan k is foreign (equals one) or domestic (equals zero). $Public_{jk}$, which indicates whether the bank j that granted loan k is state owned (equals one) or private (equals zero) and $Bank\ Size_{jk}$ which is measured as the natural logarithm of bank assets. Between the loan characteristics I include $Collateral_{ijkt}$, which is an indicator variable that equals 1 if the loan is collateralized and equals 0 otherwise, $Loan\ Amount_{ijkt}$, that is the amount of the loan in millions of Colombian pesos (COP), $Interest\ Rate_{ijkt}$, that is the interest rate of the loan in percent and $Time\ to\ Maturity_{ijkt}$, which is the number of months remaining until the end of the contract.

According to the literature on relationship lending, banks gather private information about the prospects of a firm through the relationship, and based on this information determine whether to extend more credit or change the loan terms. Thus, an important dimension of a relationship is its duration (Diamond (1991)). Petersen and Rajan (1995) and Boot and Thakor (1994) have formally modeled the association between the duration of a relationship and the loan interest rate. Their models predict that loan interest rates decline as the relationship lengthens. Boot and Thakor (1994) also found that collateral requirements decrease with the duration of the relationship. In this scenario, a firm might be concerned with losing the benefits generated through the relationship and therefore would avoid a situation where it has to delinquent on loans granted by banks with which they had long relationships. Nonetheless, if by means of having a long relationship, banks are also more willing to subsidize the firm in times of distress, at the expense of having a recovery of profits during good times, then firms should be more likely to delinquent on loans granted by banks with which they have long relationships (Bolton, Freixas, Gambacorta and Mistrulli (2013)).

The value of lending relationship, however, depends on the level of competition in the credit market, as is shown by Petersen and Rajan (1995). When credit markets are concentrated, lenders are more likely to finance young or distressed firms because it is easier for them to extract rents later. In addition, the flexibility of a firm to switch banks is limited in a concentrated market. These aspects make a lending relationship more valuable to a firm in concentrated markets.

Another dimension of a lending relationship is the previous loan delinquency of a firm. Based on how the bank has reacted to previous loan delinquencies made to its own portfolio and/or to portfolios of other banks, the firm will decide whether to delinquent on loans granted by the same bank or on loans granted by a bank with which the firm has a clean repayment history. If banks punishes the delinquencies made to their own portfolio more than the ones made to other banks (learned through the credit bureau), firms may choose to strategically keep clean records with some banks. Although there is not theoretical literature that supports this hypothesis, Murfin (2006) shows empirically

that banks write tighter loan contracts than their peers after suffering payment defaults to their own loan portfolio.

In addition, the scope of the relationship and its importance on the portfolio of the firm is another indicator of the quality of the relationship between the firm and the bank. A higher number of loans or a higher proportion of debt with a bank could indicate not only that the firm has built a good reputation with the bank, but also that the firm holds its main bank account with the bank (not observed to me) and thus, the bank could seize the money when available.

Moreover, the ability and willingness of the bank to punish the firm for misbehaving may play a key role when the firm has to decide which loan to delinquent on. The origin (domestic or foreign) and the nature (state owned or private) of a bank are important characteristics that might indicate how strict a bank will be in punishing the firm for misbehaving. Compared to domestic banks, foreign banks generally face distance constraints and informational disadvantages that can affect their ability to succeed at recovering defaults. Although there is no theory paper that supports this notion, there are empirical papers that favor this view. Mian (2006) shows that cultural and geographical differences between the foreign bank's country of origin and its subsidiary make it difficult for foreign banks to perform relational functions such as bilateral renegotiation and recovery of bad loans. These difficulties are stronger, the more geographically, or culturally distant a foreign bank is. If firms perceive the lack of ability at recovering defaults as a less threatening reaction of a bank, then firms may be more likely to delinquent on loans granted by foreign banks.

On the other hand, there are three main views that explain the existence of state owned banks (social, agency and political). The social view sees state owned banks as institutions created to promote financial development for economic growth (Gerschenkron (1962)). They allocate funds to socially profitable projects or to firms that do not have access to other funds. According to this view, private and state owned banks differ because the former maximizes profits and the later maximizes social objectives. La Porta (2002), nonetheless, documents that higher government ownership of banks is associated with slower subsequent financial development and lower growth of per capita

income and productivity. Under the agency view, state owned banks also channel resources to socially profitable activities, but public managers exert less effort than would private managers (Banerjee (1997), Hart, Shleifer and Vishny (1997)). They could, among others, perform less monitoring activities and less effort in recovering defaults. In the political view, state owned banks enable the government to finance inefficient, but politically desirable projects. Politicians divert resources to supporters who return the favor in the form of votes, political contributions, and bribes (Shleifer and Vishny, 1994). Thus, they could allow friends and supporters to misbehave in return of additional support. According to the three views, state owned banks are expected to be less active in monitoring and punishing their clients. Consequently, firms may be more likely to delinquent on loans granted by state owned banks.

IV. DATA AND DESCRIPTIVE STATISTICS

I mainly use two datasets in this analysis. The first one is a credit registry that contains information about individual commercial loans reported by financial institutions to the *Superintendencia Financiera de Colombia*, the regulator of Colombian's financial system[9]. It provides a detailed look at all the loans granted by the financial system to firms. Characteristics such as loan maturity, collateral, interest rate, amount, rating and the exact date of origination are included from 1998:12 to 2012:03 on a quarterly basis.

The second data set contains yearly information on the financial statements reported to the *Superintendencia de Sociedades,* the regulator of firms in Colombia [10]. On average, 18,000 firms report their financial statements every year and less than 0.8 percent of them have public debt. Thus, the primary source of external financing for Colombian firms is bank debt. Both datasets are merged and the resulting dataset contains 2.5

[9] The dataset was provided due to a direct link of the author of this paper with the Central Bank of Colombia.

[10] By the Colombian law 590 of 1990, all firms whose total assets are greater than the equivalent of 501 minimum salaries, are required to report their financial statements to the *Superintendencia de Sociedades*.

million loan observations made to 32,965 different firms by 120 different financial institutions.

In this paper, a sample of outstanding loans of firms that are facing liquidity constraints is used. I classify firms as facing liquidity constraints if they are able to cover some of their debt payments but not all of them. In other words, firms that face a situation in which they have to decide on which loan they stop making payments. In order to determine whether a firm has stopped making payments on a loan, I use the loan rating included in the credit register. The loan rating indicates the level of credit risk intrinsic on a loan (see Table 1). It is determined and updated periodically by the entity granting the loan at the moment of origination based on quantitative and qualitative information of the firm and the projects to be finance with the loan. The loan rating ranks from 'A' to 'E', where 'A' is the best category and 'E' is the worst. Most of the commercial loans in Colombia are classified in category 'A' at the moment of origination. During the sample period 95.2 percent of the loans were born in category 'A', 3.6 percent in category 'B' and the remained 1.2 percent were born in a lower category ('C', 'D' or 'E'). After origination, the main and only mandatory quantitative measurement used to update the rating of the loan is the number of days of delinquency[11], and it is used according to Table 1. If a non-performing loan goes back to performance, its rating is upgraded. The ratings among lenders of the same firm must be align when two conditions are meet: first, at least two financial institutions have classified the loans of the firm in a lower credit rating and second, the loans with those entities represent more than 20 percent of the loan portfolio of the firm. When these conditions are not meet discrepancy between the ratings of the loans of a firm with different banks is allowed. Moreover, in the interim, while the ratings of the institutions are not updated in the credit bureaus (thus it is not yet shared) discrepancy of ratings is also allowed.

[Table 1 around here]

Table 2 presents the quarterly transition matrix for commercial loans estimated for the period comprised between 1999-I and 2011-I. The probability of a loan having a credit

[11] See Superintendencia Bancaria de Colombia (2002).

rating j at the end of a quarter, given that its rating at the beginning of the quarter was (p_{ij}), is given by the simple ratio of the number of loans that began the quarter with rating i and ended it with rating j (n_{ij}), to the total number of loans that began with an i rating $(\sum_j n_{ij})$, that is $p_{ij} = \frac{n_{ij}}{\sum_j n_{ij}}$. Assuming that the Markov process is stationary $p_{ij}(t) = p_{ij}$, that is, the individual probabilities do not change over time. The transition matrix presented in Table 2 suggest that loans with a credit rating of 'B' are more likely to migrate to a rating of 'A', while loans with a rating of 'C' or 'D' are more likely to migrate to a rating of 'D' or 'E', respectively. That is, loans in 'D' or 'E' are more likely to end up in a permanent default.

[Table 2 around here]

Gómez, Morales-Acevedo, Pineda and Zamudio (2009), however, find that the transition probabilities are different when estimated separately for crisis times and normal times. During crisis times transitions to worse categories are more common than during normal times. Similarly, upgrading is less probably during crisis times. The authors conclude that the assumption that the transition probabilities are stationary is violated for credit transitions in Colombia, as credit ratings seem to react to changes in economic fundamentals.

I use the loan rating to isolate the sample of interest. I classify a firm as facing liquidity constraints between quarter t and quarter t+1, if having had a clean record in period t (all loans in A), it makes a payment default on some of its loans, but not in all of them, in period t+1 (B, C, D or E). Firms that delinquent on all their loans are excluded, because they do not face a decision as to which loan to delinquent on and they are more likely to reach an insolvency state. In robustness, I use the exact number of days of delinquency (available in the credit register for a short period of time), instead of a change in the credit rating of the loan, to determine if a loan becomes delinquent.

Given the censoring nature of some variables used in the analysis, i.e., *Length of Relationship, Previous Payment Default same Bank* and *Previous Payment Default other Bank*, the loan observations of the first four years are excluded. The final sample contains

49,968 loan observations given to 6,867 firms. The loans were granted by 71 banks, 17 of them were foreign banks, 6 state owned banks and the rest private domestic banks. Table 3 presents summary statistics of firms' characteristics for the excluded and the selected sample. The excluded sample is split by firms that repaid all their loans and firms that delinquent on all their loans. The last column reports the differences in means between the selected sample and the excluded sample. The excluded sample comprises 403,918 firm-quarter observations of firms that keep their loans up to date from one quarter to the next and 1,763 firm-quarter observations of firms that stop making payments on all their loans from one quarter to the next. The selected sample, on the other hand, is composed by 9,671 firm-quarter observations of firms that stop making payments on some of their loans but not in all of them. The firms in the selected sample seem to have poor financial performance compared to the excluded sample. The mean *Return on Equity (ROE)* is 5.0 percentage points lower, the *Current Ratio (CR)* is 43.3 percentage points lower and the *Debt to Equity Ratio* is 41.0 percentage points higher. Moreover, firms are smaller in terms of assets size, have a higher number of lenders and loans and have a higher number of previous non-performing loans. All this differences in means are statistically significant.

[Table 3 around here]

Graph 1 represents an average firm in the selected sample. It has five outstanding loans with four different banks. The payments in all its loans are up to date in quarter t. However, in quarter t+1 the firm stops making payments on one of its loans.

[Graph 1 around here]

V. RESULTS

1. Main Findings

Table 4 presents summary statistics of the variables used in this analysis. The average *Length of Relationship* is 9.6 quarters. Around 5.7 percent of the loans were granted by a bank with which the firm had its unique payment delinquency and 25.6 percent by a bank

that had not experienced any of the previous delinquencies of the firm. The average number of loans that a firm has with a bank is equal to 1.3. The mean *Share of Wallet* is 24.8 percent, which is in line with the total number of loans and lenders of the average firm represented in Graph 1. Foreign banks granted 13.7 percent of the loans in the sample, and domestic banks granted the other 86.3 percent. Moreover, state owned banks granted 2.9 percent of the loans and private banks granted the rest. With respect to the loan characteristic, 45.8 percent of the loans have collateral, the average loan amount is 452.2 million COP (about 250 thousand USD) and the average interest rate is 17.3 percent. About 40 percent of the loans have a short-term maturity and the average time to maturity is 20.8 months.

[Table 4 around here]

Table 5 presents differences in means of relationship, bank and loan characteristics between delinquent loans and loans that kept their payments up to date. The delinquent loans represent 23.3 percent of the total sample. The *Length of Relationship* is slightly shorter for the delinquent loans. The proportion of loans granted by a bank to which the firm had its unique payment delinquency in the past (*Previous Delinquencies Same Bank*), is higher for the delinquent loans. Moreover, the proportion of loans granted by banks that had not experienced any of the previous delinquencies of the firm (*Previous Delinquencies Different Bank*), is lower for the delinquent loans. Thus, firms seem to choose to stop making payments to the banks with which they had delinquencies in the past. The difference in the number of loans that the firm holds with a bank is not economically significant. The *Share of Wallet* is higher for the delinquent loans, which indicates that firms seem to prefer to stop making payments to the banks with which they have a higher percentage of debt.

The proportion of loans granted by foreign banks is lower in the group of delinquent loans than on the group of loans that remain with their payments up to date. And the proportion of loans granted by state owned banks is higher in the group of delinquent loans. With respect to the loan terms, the delinquent loans have higher collateral, less loan amount, lower interest rates, shorter maturity and longer time to maturity. All these differences in means are statistically significant.

[Table 5 around here]

Table 6 shows the results of a linear probability regression of the binary variable *Delinquency* on relationship, bank and loan characteristics[12]. As discussed before, an important part of the methodology is to isolate the population of interest. Only firms that stop making payments in some of their loans but not in all of them are included. Given that in the selected sample firms have more than one loan in the same quarter, firm-time fixed effects can be included to control for all the time-varying and invariant, observable and unobservable firm characteristics.

[Table 6 around here]

The dependent variable equals 1 for delinquent loans and equals 0 if the payments of the loans remain up to date. The results in Column I suggest the probability to make a payment delinquency on a loan decreases with the length of the relationship between the firm and the bank. This result is both statistically and economically significant[13]. For the average relationship (9.6 months), the coefficient of -0.23 represents a decrease of 2.2 percentage points in the likelihood to delinquent on a loan. This effect as a percentage of the mean likelihood is equal to 9.6%. I performed additional exercises in order to check the robustness of this result. Table 7 present the results of several models that include dummy variables for the length of the relationship instead of the variable in quarters. *Long Relationship* is an indicator variable that takes the value of one if the length of the relationship is above the 95 percentile (13 quarters). *Short Relationship* is an indicator variable that takes the value of one if the length of the relationship is below the 25 percentile (4 quarters). When the variable *Long Relationship* is included in the model (Columns I and II) the results suggest that firms are 3.03 percentage points less likely to delinquent on loans granted by banks with whom they have a long relationship. If instead

[12] As robustness, I use the exact number of days of delinquency instead of a change in the credit rating of the loan, to determine if a loan becomes delinquent. The results are presented in Appendix Table A.3 and are consistent with the results presented in Table 6.

[13] Appendix Table A.1 reports the results of a model that includes as an alternative measure for the length of relationship the *Number of Old and New Loans* with the bank. The results are in line with the ones found with the more standard measure length of relationship.

the variable *Short Relationship* is included the results suggest that firms are 1.7 percentage points more likely to delinquent on loans granted by banks with which they have a short relationship. Table 8 presents the results for a sample of firms that have both, loans with banks with which they have very short relationships (below the 25 percentile) and loans with banks with which they have very long relationships (above the 95 percentile). The sample is composed by 2.723 observations. The results show that firms are 8.4 to 11.5 percentage points less likely to delinquent on long relationships. These exercises confirm the results found in Table 6 where the length of the relationship was included in quarters.

[Table 7 around here]

[Table 8 around here]

These result are in line with the hypothesis that firms get financial benefits through the relationship and therefore they are less likely to default on banks with which they have long relationships. In order to determine what are the benefits of bank-firm relationships in Colombia, I estimated the effect of relationship characteristics on the loan terms (*Interest Rate, Collateral, Collateralization, Maturity* and *Ln(loan amount)* of all new loans granted between 2002 and 2011. The results, presented in Table 9, suggest that as the relationship lengthens firms get loans with lower interest rates, lower collateral requirements and higher loan amounts. However, the *Maturity* has a slight decrease. For an average relationship there is a decrease of 90 basis points on the interest rate, which represent a decrease by 5,2 percent on the average interest rate. The decrease on the likelihood to be required to pledge collateral corresponds to 80 basis points. And the increase on the loan amount is equivalent to 1.6 million COP. These results are robust to the inclusion of loan characteristics.

[Table 9 around here]

Moreover, I find that if the firm has had delinquencies in the past only with the bank that granted the loan, it is more likely to stop making payments on loans granted by that bank. The coefficient reported in Column 1 of Table 6, indicates that the likelihood to be delinquent on a loan increases by 10.1 percentage points. In contrast, if the borrower has

had delinquencies only with other banks, different to the one that granted the loan, it will be less likely to stop making payments on loans granted by that bank. The coefficient reported in Column 1, indicates that the likelihood to be delinquent on a loan decreases by 10.8 percentage points. In order to test the robustness of this result, I re-estimate the model including the *Number of Previous Delinquencies Same Bank* instead of the binary variables for previous delinquencies. The results, reported on Appendix Table A.2, suggest that each arrear with a bank will increase the likelihood to stop making payments on loans with that bank by 4.2 to 4.9 percentage points. This is consistent with the idea that firms strategically keep clean records with some banks, because they anticipate that banks punish more harshly those defaults made to their own loan portfolio. This can be evidenced in Table 9, which aims to analyze not only the benefits of the relationship by also the costs of loan delinquencies. It shows that firms that had arrears in the past get loans with interest rates that are 90 basis points higher (see coefficient on *Previous Delinquent Loans)*. However, if some of the arrears were with the bank granting the new loan, the interest rate is even higher by additional 44 basis points (see coefficient on *Previous Delinquencies to Bank*). This translates on a total increase of 1.3 percentage points on the interest rate if the firm had arrears in the past with the bank granting the loan (compare to an increase of 90 basis points if the firm only has arrears with other banks). The likelihood to be required to pledge collateral on a new loan is also affected by the previous loan delinquencies. It increases by 2.4 percentage points if a firm had arrears in the past with other banks and by 6.3 percentage points if the arrears were with the bank that is granting the new loan. In turn, the loan amount decreases for new loans when the firm had arrears in the past with other banks by 1.1 million COP, and if some of the arrears where with the bank granting the loan, the loan amount decrease by 2.3 million COP. All together, the results on Table 9 confirms not only that banks punish more the delinquencies make to their own portfolio but also that most of the benefits of the relationship in terms of better loan conditions described before are loss with the existence of previous loan delinquencies.

Lastly, the number of loans with a bank seems to decrease the likelihood to stop making payments on a loan. According to Table 6 (Column I) an additional loan with a bank

decreases the likelihood of delinquency with that bank by 3.28 percentage points. *Share of Wallet*, however, does not seem to be a determinant factor on the delinquency choice.

With respect to the bank characteristics, the results suggest that firms are more likely to delinquent on loans granted by foreign banks than on loans granted by domestic banks. If a loan is granted by a foreign bank the likelihood that a firm delinquent on it increases by 1.37 percentage points. This corresponds to an increase in the mean likelihood of 5.9%. Nonetheless, in robustness I interact the variable *Foreign Bank* with a variable that indicates whether the bank enter the through an acquisition or through *Greenfield Investment*. The results, presents in Appendix A.2 (Column I), suggest that firms are more likely to delinquent on foreign banks only when the bank that granted to loan enter the market as a Greenfield Investment. This is consistent with previous empirical findings that show that foreign banks are less successful at recovering defaults due to distance constraints (Mian (2006)). In order to check the robustness of this result, I performed an additional exercise. Column I of Table 10 presents the results for a sample of firms that have loans granted by both foreign and domestic banks. The sample is composed by 28,922 observations. The results show that firms are 94 basis points more likely to delinquent on loans granted by foreign banks, however the coefficient is not statistically significant. Looking at the loan characteristics of loans granted by foreign banks also show that foreign banks do not price their loans or include additional collateral requirements anticipating more delinquencies. In Table 11, I analyze the determinants of loan contracts for a sample of loans granted to firms that received loans from both domestic and foreign banks during the same quarter. Loans granted by foreign banks have lower interest rates (-37 basis points) and are less likely to be required to pledge collateral (-9.7 percentage points). They, however, have shorter maturities (-5.3 months) and lower loan amounts (these results are robust to the inclusion of loan characteristics).

[Table 10 around here]

[Table 11 around here]

Moreover, firms are more likely to delinquent on loans granted by state owned banks than on loans granted by private banks. If a loan is granted by a state owned bank the likelihood that the firm stop making payment on it increases by 6.2 percentage points. This is consistent with the view that state owned banks are less active in monitoring and punishing their clients. In order to check the robustness of this result, I performed an additional exercise. Column II of Table 10 presents the results for a sample of 8,774 observations of firms that have loans granted by both state owned and private banks. The results show that firms are 4.6 percentage points more likely to delinquent on loans granted by state owned banks, consistent with the results of Table 6. State owned banks tend to grant loans with softer loan conditions. In Table 12, I analyze the determinants of loan contracts for a sample of 3,024 loans, granted to firms that received loans from both state owned banks and private banks during the same quarter. Loans granted by state owned banks have lower interest rates (-23 basis points) and are less likely to be required to pledge collateral (-3.8 percentage points). They, however, have shorter maturities (-2.1 months) and slightly lower loan amounts.

[Table 12 around here]

The results in the loan characteristics suggest that firms are more likely to stop making payments on collateralized loans. The likelihood to be delinquent on a collateralized loan is 11.5 percentage points higher compared to non-collateralized loans (Table 6)[14]. A possible explanation for this is that firms anticipate that banks that included collateral on the loan contract are more certain that the firm will repay the loan. While banks that did not include collateral on the loan terms might panic and might try to push the firm into a bankruptcy process. Collateralized loans also give a firm more bargaining power in case the loan ends up in a renegotiation process. The results for collateral, however, are less pronounced when the firm is experiencing a long-term distress, as it is analyzed in robustness (see Table 17). Moreover, the results suggest that firms are more likely to delinquent on larger loans. For a loan with an amount equal to the mean amount of the sample the probability to delinquent is 2.5 percent higher. A potential explanation for this

[14] Appendix Table A.2 presents the results of a model that includes Collateralization instead of Collateral and the results suggest that firms are more likely to stop making payments on loans with a higher collateralization.

is that firms anticipate that banks might be more willing to start a renegotiation process if the loan is larger.

In line with this, firms are more likely to delinquent on loans with a relatively long time to maturity[15]. An average loan, with a time to maturity equal to 20.8 months, will be 1.7 percentage points more likely to be delinquent. This suggests that firms prefer to default on the loan that gives them more time to renegotiate. Finally, higher interest rates seem to decrease the likelihood of making a payment delinquency but this result is not robust to stronger specifications presented below. Overall, the results for the loan conditions suggest that firms anticipate the bank's willingness to renegotiate a loan contract.

In Column II of Table 6, I present the results for the model including bank fixed effects. The magnitude of the coefficients is slightly different but the sign and significance of the results remain the same for most of the variables, excluding the interest rate that loses its significance. In Column III, instead of including firm-time and bank fixed effects, I include firm-bank-time fixed effects. The size of the sample has a considerable reduction. The reason for this is that only firms that have more than one loan with the same bank and that make a payment delinquency on some of them, but not in all, are included. This exercise is useful to understand which loan characteristics play a more important role in the delinquency choice of a firm. The results are similar to the ones presented before. The sign and the significance of the coefficients remain the same, however, the magnitude of the coefficients increased. Collateral seems to be the most important characteristic in the delinquency choice of a portfolio of loans with the same bank.

[15] In Appendix Table A.1, I re-estimate the model excluding the sample of firms that start a new relationship (have had only one existing loan with any of their banks) as in these cases the length of relationship is determined by the duration of a single loan and a long time to maturity might translate into a short relationship. The results show that even excluding this sample of firms the time to maturity remain positive and significant.

2. Various Robustness

a. Methodology:

I estimate the model using a conditional Logit model instead of a Linear Probability model[16]. The results reported in Table 13 as odds ratios, are in line with the ones obtained using a Linear Probability Model. The sign and significance of the coefficients remain the same as the ones reported in Table 6.

In addition, I estimate the model using a Probit model. I exclude all the sets of fixed effects and include firm and macroeconomic characteristics instead. I estimate the model not only using the sample of firms that stop making payments in some of their loans but also considering the firms that stop making payments in all of their loans and the firms that repaid all their loans. Characteristics of these three different groups are presented on Table 3. Notice that only a minority of firms delinquent on all their loans from one quarter to the next, and the ones that do have on average 1.2 loans and only one lender.

The results for the Probit model are presented in Table 14. Column I shows the results for the sample of firms that stop making payments in some of their loans, which are also in line with the results from the linear probability model reported in Table 6. Column II adds the sample of firms that stop making payments in all their loans. The sample size increases from 49,962 loan observations to 51,975 loan observations, which also reveals that only few firms faced extreme liquidity constrains during the sample period. The coefficients have the same sign and significance compared to Column I, however their magnitude has a slight increase. Finally, Column III adds the firms that repaid all their loans and it corresponds to the population of loans. It is composed by 1,275,994 loan observations and it indicates that most of the firms experience no distress during the sample period. The average likelihood of delinquency of the sample drops to 0.9%. Interestingly, most of the coefficients remain with the same sign and significance, however, and consistent with the composition of the sample, the magnitude of the

[16] This model has the disadvantages that predicted values may by less than zero or greater than one, and that the OLS covariance matrix estimate is inconsistent.

coefficients drops. Overall these exercises show that my results are robust to different methodologies and sample compositions.

[Table 13 around here]

[Table 14 around here]

b. Effect of a Change in the Value of Bank-Firm Relationships

In this section I analyze if a change in the value of bank-firm relationships have an effect on the firms' selection of arrears. I do so by exploring a variation on the amount of credit information shared between financial institutions through credit bureaus. The variation is generated thanks to the introduction of the Habeas Data Law in December of 2008. Prior to the introduction of this law, banks could observe the entire credit history of a firm. Both positive and negative information was observable for an unlimited length of time. In other words, the memory of the credit bureau was 'infinite'. With the introduction of the Habeas Data law, the memory of the credit bureaus was shortened and limited to a length equal to twice the length of the delinquency period of a loan.

The decrease on the information shared through credit bureaus naturally increased the level of asymmetric information in the credit market (now it results more difficult for banks to distinguish between good and bad borrowers). This in turn allows banks to extract more private information through the relationships with their clients. Thus, the value of the relationship should increase. Under this scenario firms should be even less likely to stop making payments on loans granted by banks with who they have long relationships after the introduction of the Habeas data law. In order to test if that is the case, I include interactions in the main specification with a dummy that represents the introduction of the law.

The results, presented in Table 15, suggest that after the introduction of the Habeas Data law firms are even less likely to stop making payments on loans granted by banks with who they have a strong relationship. A longer length of relationship, a higher number of loans and/or a higher share of wallet with a bank will translate on a lower probability that a firm choose to stop making payment on loans granted by that bank. This result

highlights the finding that bank firm relationships play a very important role on the selection of the arrears of a firm.

[Table 15 around here]

c. Short Term vrs Long Term Distress:

In order to determine if the delinquency decisions are affected by the length of the period of distress of a firm, I include interaction terms with the variable *Long Term Distress*. This is in indicator variable that takes the value of 1 if the firm remains in a state of delinquency for more than three quarters and zero otherwise. Of the 6,867 firms included in the sample, only 728 firms were in delinquency for more than three consecutive quarters. That is, most of the delinquencies in the sample are short-term temporal delinquencies rather than long-term permanent defaults. The results, presented in Table 16, show that most of the interaction terms turn out to be insignificant. That is, the length of the period of distress of the firm does not seems to modify most of its preferences with respect to which loan to delinquent on. There are however some exceptions, if the firm is facing a long term distress it is even less likely to stop making payments on loans granted by banks with which they have a higher number of outstanding loans. This might be reflecting that the firm has additional products with the bank, i.e., main bank account that could be automatically sized by the bank in case of default. In addition, firms seem to be less likely to stop making payments on collateralized loans than on uncollateralized loans. This suggests that firms are more afraid of loosing the collateral when the distress is not for a short time of period. Finally, firms also seem to be even more likely to stop making payments on larger loans. This might be reflecting that in case of default firms might prefer to deal with a big loan granted by one bank rather than with several small loans granted by more than one bank.

[Table 16 around here]

d. Renegotiations vrs Loan Delinquencies:

The existence of renegotiations might naturally impact the decision of a firm as on which loan to stop making payments. Nonetheless, there is little information available about renegotiations of commercial loans in Colombia and, in particular, there is not detailed information that indicates whether and when a loan has been renegotiated. According to press reports and general statistics, the most common practice among banks in Colombia in terms of renegotiations is to extend the maturity of the loan[17]. Based on this information, I analyze the dynamic of the *Maturity* in the lifetime of a loan, and classify a loan as being renegotiated when its *Maturity* increases from one quarter to the next one.

From 2002 to 2010 there are in total 93.907 loan renegotiations made on 54.223 different loans (some loans are renegotiated more than once). According to these numbers about 8.3% of the loans in the credit register are renegotiated at some point in time. The proportion of renegotiations in the sample of loans used for my main empirical exercise is somehow lower and represents 5.4% of the total sample (compared to a 23.3% of loans that stop making payments). This is not surprising, as previous literature has reported that the majority of renegotiations occur outside of default or financial distress. For example, Roberts and Sufi (2008) using a sample of credit agreements between U.S. publicly traded firms and financial institutions; find that renegotiations are rarely associated with a covenant violation or a payment default.

I use a Multinomial Logit Model[18] with a categorical dependent variable that takes the value of 0 if the loan is repaid, 1 if the loan is renegotiated and 2 if the loan starts an arrear, to analyze the likelihood of each of these outcomes. I estimate the model using the sample selected for the main empirical exercise and define as a 'base outcome' the repayment of the loan. The results, presented in Appendix Table A.4, suggest that a

[17] See http://ape.com.co/finanzas/item/710-crece-la-restructuracion-de-creditos-a-las-empresas.

[18] The Multinomial Logit model was first introduced by McFadden (1974) to explain the choice of transportation modes of urban commuters.

higher length of relationship is associated with a both, a lower probability to renegotiate a loan and a lower probability to stop making payments on a loan. On the other hand the existence of previous loan delinquencies with the bank that grant the loans increases both the likelihood of renegotiation and the likelihood of loan delinquency, however it has a higher contribution for the likelihood of loan delinquency. The existence of previous delinquencies with other banks influences negatively the likelihood to stop making payments on a loan and do not seem to have an impact on the likelihood of renegotiation. In addition, the results suggest that firms are less likely to stop making payments on loans granted by banks that have renegotiated their loans in the past. In turn, the results suggest that if there have been renegotiations before between the bank and the firm; it is more likely that renegotiation take place again (see the coefficient on *Previous Renegotiations Same Bank*, which show that the likelihood of renegotiation increases by 7.4 percentage points).

With respect to the bank characteristics I find that loans with foreign banks are more likely to end up in either renegotiation or delinquency, however the likelihood to end up in a delinquency increases relatively more. Loans granted by state owned banks are less likely to be renegotiated and more likely to become delinquent on their payments. Finally, the loan characteristics reveal that loans with collateral or longer time to maturity are less likely to be renegotiated and more likely to start having arrears, while loans with higher loan amounts or higher interest rates are more likely to be renegotiated.

As an additional robustness, I re-estimate the Linear Probability Model of my main speciation including as an additional relationship characteristic the indicator variable *Previous Renegotiations Same Bank.* The results, presented in Appendix A.5, are in line with the main results presented in Table 6 and suggest that the existence of previous renegotiations between the firm and the bank decreases the probability of loan delinquency.

Overall the results help to uncover the role of renegotiation in the firm's choice of loan delinquencies. However, further research needs to be done to understand the role of renegotiation ex post payment delinquencies.

VI. CONCLUSIONS

In this paper I analyze the repayment decisions of firms with multiple loans that experience a liquidity shock and are forced to stop making payments on at least one of their loans. My empirical strategy consists of two steps. First, I isolate the group of firms that having had all their loan payments up to date in a given quarter t, start having payment delinquencies in some of their loans but not in all of them on the following quarter, $t + 1$. Second, in order to understand how these decisions are made and what their main drivers are, I use a linear probability model in which the dependent variable is an indicator variable for loan delinquency. I focus my analysis on a diverse set of variables that include relationship, bank and loan characteristics. In addition, I include a set of firm-time fixed effects in order to account for any observable and unobservable firm, time and firm-time heterogeneity.

I find that firms are less likely to delinquent on loans granted by banks with which they have long relationships and by banks with which they have a clean repayment history. These results suggest that firms are concerned about losing the benefits gained through the relationship and that from previous experience, they anticipate that banks will punish more the delinquencies made to their own loan portfolio than to the one of their peers. I also find that firms are more likely to delinquent on loans granted by foreign and by state owned banks and on loans that are more likely to end up in a renegotiation process. This suggests that the ability and willingness of the bank to punish the firm for misbehaving play an important role on firm's decision. Overall, the results suggest that firms assess the influence of their delinquency choices on their ability to obtain new credit in the future.

In future versions of the paper I plan to analyze how the degree of financial distress of the firm affects its decision in regards to which loan to delinquent on. In principal, whereas an illiquid firm might be concerned about its ability to access financial resources after a payment delinquency, an insolvent firm might be more concerned about the

liquidation cost after a default. Nonetheless, whereas solvency defaults are quite rare, liquidity defaults are relatively common. Therefore, I expect my current result to be mainly driven by liquidity defaults.

In addition, I will examine how the level of information asymmetries in the credit market affects the repayment decisions of firms. This analysis will be possible thanks to a variation on the memory of the credit bureaus provided by the introduction of the Habeas Data law in Colombia. The law was ratified in 2009, and it prohibited institutions in Colombia to access the entire credit history of borrowers. Since then, the negative credit information is observable only for a period that depends on the length of the delinquency period. The decrease on the amount of information shared among financial institutions could have an effect on firm's decision, as now banks can accumulate more private information about the firm. Thus, the monopoly power attached to exclusive customer information is increased (Jappelli and Pagano, 1993).

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GRAPH 1

The Graph represents an average firm on the selected sample. It is a firm that has five loans with four different banks. It has two loans with Bank 1 and one loan with each of the other banks. In quarter t, all its loans have a rating equal to "A" (best loan rating = the loan is up to date). In quarter t+1, one of the loans jumps to rating "B" (there is a delinquency on that loan). The other four loans remain in rating "A".

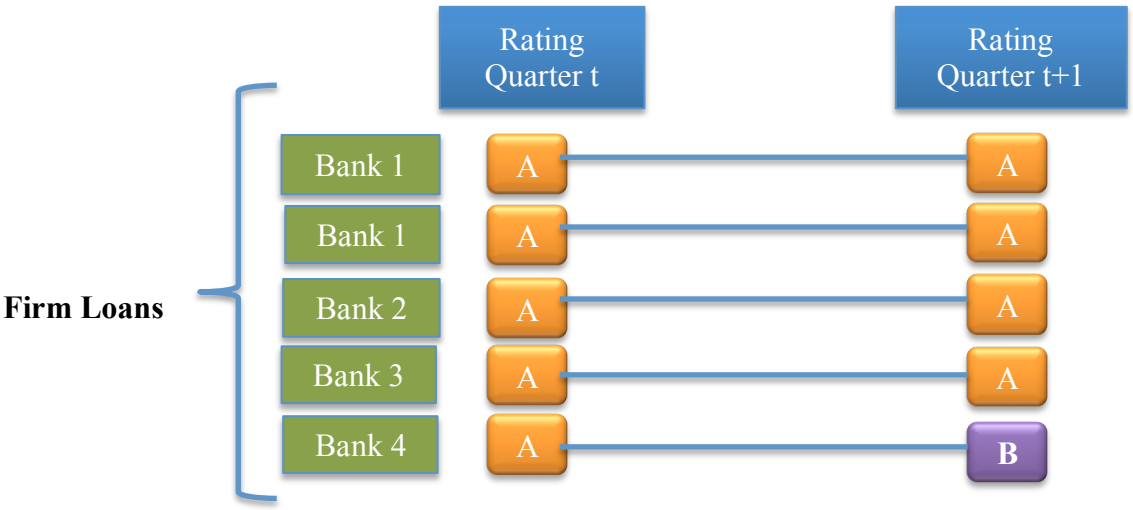

TABLE 1

The Table presents the loan rating classification of the Colombian credit register. The loan rating depends on the number of days of delinquency on the loan and also in the amount of collateral for the category E.

Loan rating	Days delinquent
A	< 30
B	30 - 89
C	90 - 149
D	150 - more
E	Loss given default = 100%

TABLE 2

Estimated Quarterly Transition Matrix for Colombian Commercial loans

The Table presents the estimated quarterly transition matrix for Colombian Commercial loans. It is estimated based on a Markov transition probability model, using information comprised between 1999-I and 2011-II. The categories are defined in Table 1. The matrix show the likelihood of a credit quality staying unchanged or moving to any other category over a period of one quarter. Each element of the matrix, p_{ij}, shows the probability of the credit quality of a loan being equal to i in period t, and equal to j in period t+1.

	A	B	C	D	E
A	0.966	0.029	0.004	0.001	0.000
B	0.305	0.558	0.097	0.035	0.005
C	0.070	0.085	0.561	0.258	0.026
D	0.024	0.016	0.031	0.801	0.129
E	0.013	0.005	0.007	0.036	0.938

TABLE 3

Differences in Means of Firm's Characteristics Between the Selected Sample and the Excluded Sample.

The Table reports the mean of firm characteristics for both, the sample of firm observations excluded and the sample of firm observations selected. The sample of firm observations excluded is subdivided by whether they repay all their loans or whether they delinquent on all of them. The last column presents a t-test for the differences in means between the Selected Sample and the Excluded Sample. The number of total firm observations equals 415,352. COP: Colombian Peso. In June 2011: 1,800 COP = 1 US Dollar or 1 Million COP = 555 US Dollars. Note: *** Significant at 1%, ** significant at 5%, * significant at 10%.

Firm Characteristic	**Definition**	**Unit**	**Excluded Sample**		**Selected Sample**	**Difference in Means**
		Firms with arrears on:	**No Loan**	**All Loans**	**Some Loans**	
Return on Equity (ROE)	= Net Income/Equity.	%	15.1	7.6	10.1	-4.97***
Current Ratio (CR)	= Current Assets/Current Liabilities.	%	218.3	253.5	175.1	-43.26***
Debt to Equity Ratio	= Liabilities/Equity.	%	219.1	241.6	260.2	41.02***
Assets	= Total Assets.	Million COP	25 717.4	12 124.7	19 162.7	-6495.6**
Small Firm	= 1 if the firm is small in terms of assets size, = 0 otherwise.	%	44.8	64.8	46.2	1.26*
Age as Borrower	Time in which the firm has had a loan with the financial system.	Quarters	14.8	10.9	15.2	0.44***
Number of Lenders	Number of lenders with whom the firm has a loan.	-	2.7	1.0	4.3	1.623***
Number of Loans	Number of outstanding loans.	-	3.0	1.2	5.2	2.143***
Delinquent Loans	Number of delinquent loans.	-	0.0	1.2	1.2	1.2***
Previous Delinquent Loans	= 1 if the firm delinquent on a loan in the past, = 0 otherwise.	0/1 %	12.3	20.8	31.4	19.10***
Firm Rating	Weighted quality of the loans of the firm (1 lowest, 5 highest)	1-5	5.0	5.0	5.0	0.00
Number of Firm Observations			403 918	1 763	9 671	415 352

TABLE 4

The table provides the definition of relationship, bank and loan characteristics (a) and reports loan level summary statistics of relationship, bank and loan characteristics. The mean, median and standard deviation (SD), min and max are presented for every variable (b). The number of loan observations equals 49,986. COP: Colombian Peso. In June 2011: 1,800 COP = 1 US Dollar or 1 Million COP = 555 US Dollars.

a. Definition of Variables.

Variable	Description	Unit
Relationship Characteristics		
Length of Relationship	Length of the bank-firm relationship.	Quarters
Number of Old and New Loans	Number of old and new loans between a bank and a firm.	-
Previous Delinquencies to Bank	= 1 if firm has have an arrear before with the bank, = 0 otherwise.	0/1 %
Previous Delinquencies Same Bank	= 1 if firm has have an arrear before **only** with the bank, = 0 otherwise.	0/1 %
Previous Delinquencies Different Bank	= 1 if firm has have an arrear before **only** with other banks, = 0 otherwise.	0/1 %
Number of Previous Delinquencies Same Bank	Number of previous arrears that the firm has with the bank.	-
Number of Previous Delinquencies Different Bank	Number of previous arrears that the firm has with other banks.	-
Previous Renegotiations Same Bank	= 1 if firm has have a renegotiation before with the bank, = 0 otherwise.	0/1 %
Number of Previous Renegotiations Same Bank	Number of previous renegotiations that the firm has with the bank.	-
Number of Loans	Number of outstanding loans the firm has with the bank.	-
Share of Wallet	Proportion of loans that the firm has with the bank.	%
Bank Characteristics		
Foreign Bank	= 1 if loan granted by foreign bank, = 0 otherwise.	0/1 %
State Owned Bank	= 1 if loan granted by public bank, = 0 otherwise.	0/1 %
Bank Size	Natural logarithm of the assets of the bank.	-
Loan Characteristics		
Collateral	= 1 if loan is collateralized, = 0 otherwise.	0/1 %
Collateralization	Proportion of the loan amount that is collateralized.	%
Loan Amount	Outstanding loan size.	Million COP
Ln Loan Amount	Natural logarithm of loan size.	-
Interest Rate	Interest rate on the loan.	%
Fixed Interest Rate	= 1 if loan has a fixed interest rate, = 0 otherwise.	0/1 %
Maturity	Loan maturity	Months
Short Term	= 1 if maturity of loan is less than a year, = 0 otherwise.	0/1 %
Time to Maturity	The time remaining until the end of the loan contract.	Months

TABLE 4

b. Summary Statistics for Relationship, Bank and Loan Characteristics.

Variable	Mean	Median	SD	Min	Max
Relationship Characteristics					
Length of Relationship	9.6	7.0	7.8	1.0	49.0
Number of Old and New Loans	6.2	4.0	6.3	1.0	65.0
Previous Delinquencies to Bank	10.5	0.0	30.7	0.0	100.0
Previous Delinquencies Same Bank	5.7	0.0	23.1	0.0	100.0
Previous Delinquencies Different Bank	25.6	0.0	43.6	0.0	100.0
Number of Previous Delinquencies Same Bank	0.2	0.0	0.8	0.0	23.0
Number of Previous Delinquencies Different Bank	1.2	0.0	3.2	0.0	70.0
Previous Renegotiations Same Bank	22.9	0.0	42.0	0.0	100.0
Number of Previous Renegotiations Same Bank	0.5	0.0	1.4	0.0	24.0
Number of Loans	1.3	1.0	0.5	1.0	2.0
Share of Wallet	24.8	16.4	24.8	0.0	100.0
Bank Characteristics					
Foreign Bank	13.7	0.0	34.4	0.0	100.0
State Owned Bank	2.9	0.0	16.7	0.0	100.0
Bank Size	22.7	23.0	1.5	0.0	24.8
Loan Characteristics					
Collateral	45.8	0.0	49.8	0.0	100.0
Collateralization	55.4	0.0	95.9	0.0	500.0
Loan Amount	451.1	82.5	1836.2	0.0	50000.0
Ln Loan Amount	4.2	4.4	2.2	18.4	10.8
Interest Rate	17.3	16.8	6.7	0.4	40.0
Fixed Interest Rate	8.3	0.0	27.5	0.0	100.0
Maturity	36.0	25.0	42.1	0.0	360.0
Short Term	37.7	0.0	48.5	0.0	100.0
Time to Maturity	21.1	11.0	33.2	0.0	331.0

TABLE 5

Differences in Means of Relationship, Bank and Loan Characteristics between Delinquent Loans and Loans that Remain Up to Date

The Table compares the means of Relationship, Bank and Loan Characteristics between loans that start having an arrear and loans that remain up to date, using a t-test. The number of observations equals 49,967. Definitions of the variables can be found in the Table 4. Note: *** Significant at 1%, ** significant at 5%, * significant at 10%.

Variable	Delinquency == 0	Delinquency == 1	Difference in means	
Relationship Characteristics				
Length of Relationship	9.7	9.0	-0.70	***
Previous Delinquencies Same Bank	4.3	10.2	5.90	***
Previous Delinquencies Different Bank	28.2	16.9	-11.30	***
Number of Loans	1.3	1.3	-0.03	***
Share of Wallet	22.7	32.0	9.30	***
Bank Characteristics				
Foreign Bank	14.1	12.5	-1.60	***
State Owned Bank	2.6	3.6	1.00	
Bank Size	22.7	22.6	-0.06	***
Loan Characteristics				
Collateral	41.9	58.5	16.60	***
Loan Amount	483.0	347.0	-136.00	***
Interest Rate	17.4	17.2	-0.20	***
Short Term	0.4	0.2	-0.20	***
Time to Maturity	19.4	25.3	5.90	***
Number of observations	38 345	11 622		

TABLE 6

Likelihood to Make a Payment Delinquency on a Loan.

The Table reports regression results from a linear probability model. The dependent variable is *Delinquency* that equals one when a loan is delinquent and zero otherwise. Column (I) report results of a model that includes relationship, bank and loan characteristics as independent variables, firm-time fixed effects are included. In Column (II) bank fixed effect are added. In Column (III) firm-bank-time fixed effects are included. Definitions of the variables can be found in the Table 4. Coefficients are listed in the first row, robust standard errors that are corrected for clustering at the firm level are reported in the row below in parentheses, and the corresponding significance levels are in the adjacent column. Note: *** Significant at 1%, ** significant at 5%, * significant at 10%.

Dependent Variable	**Delinquency**		
Models	I	II	III
Relationship Characteristics			
Length of Relationship	-0.23***	-0.16***	
	(0.05)	(0.05)	
Previous Delinquencies Same Bank	10.11***	9.41***	
	(2.12)	(2.10)	
Previous Delinquencies Different Bank	-10.77***	-8.96***	
	(1.53)	(1.52)	
Number of Loans	-3.28***	-3.67***	
	(0.72)	(0.73)	
Share of Wallet	0.03	0.03*	
	(0.02)	(0.02)	
Bank Characteristics			
Foreign Bank	1.37*		
	(0.73)		
State Owned Bank	6.20***		
	(1.64)		
Bank Size	-0.12		
	(0.21)		
Loan Characteristics			
Collateral	11.46***	12.89***	47.72***
	(0.49)	(0.54)	(3.55)
Ln Loan Amount	0.42***	0.32**	3.29***
	(0.14)	(0.14)	(1.01)
Interest Rate	-0.19***	-0.03	-0.32
	(0.04)	(0.05)	(0.35)
Time to Maturity	0.08***	0.10***	1.12***
	(0.01)	(0.01)	(0.17)
Constant	28.38***	62.12*	3.64
	(4.75)	(36.48)	(8.66)
Firm-Time Fixed Effects	YES	YES	NO
Bank Fixed Effects	NO	YES	NO
Firm-Bank-Time Fixed Effects	NO	NO	YES
R-squared	0.15	0.17	0.49
Number of observations	49,967	49,967	3,728

TABLE 7

Likelihood to Make a Payment Delinquency on a Loan. Discrete Definition of Relationship.

The Table reports regression results from a linear probability model. The dependent variable is *Delinquency* that equals one when a loan is delinquent and zero otherwise. Columns (I) and (III) report results of a model that includes relationship, bank and loan characteristics as independent variables, firm-time fixed effects are included. In Columns (II) and (IV) bank fixed effect are added. *Long Relationship* is an indicator variable that takes the value of one if the length of the relationship is above the 95 percentile (13 quarters). *Short Relationship* is an indicator variable that takes the value of one if the length of the relationship is below the 25 percentile (4 quarters). Definitions of the rest of the variables can be found in Table 4. Coefficients are listed in the first row, robust standard errors that are corrected for clustering at the firm level are reported in the row below in parentheses, and the corresponding significance levels are in the adjacent column. Note: *** Significant at 1%, ** significant at 5%, * significant at 10%.

Dependent Variable	**Delinquency**			
Models	I	II	III	IV
Relationship Characteristics				
Long Relationship	-3.03***	-2.02***		
	(0.75)	(0.76)		
Short Relationship			1.69**	1.15
			(0.74)	(0.75)
Previous Delinquencies Same Bank	10.29***	9.56***	10.56***	9.73***
	(2.12)	(2.11)	(2.13)	(2.11)
Previous Delinquencies Different Bank	-10.26***	-8.56***	-9.78***	-8.26***
	(1.53)	(1.52)	(1.52)	(1.51)
Number of Loans	-3.39***	-3.72***	-3.50***	-3.74***
	(0.72)	(0.73)	(0.72)	(0.73)
Share of Wallet	0.02	0.03*	0.02	0.03
	(0.02)	(0.02)	(0.02)	(0.02)
Bank Characteristics				
Foreign Bank	1.41*		1.42*	
	(0.73)		(0.73)	
State Owned Bank	6.41***		6.67***	
	(1.64)		(1.64)	
Bank Size	-0.17		-0.22	
	(0.21)			
Loan Characteristics				
Collateral	11.46***	12.91***	11.46***	12.92***
	(0.49)	(0.54)	(0.50)	(0.54)
Ln Loan Amount	0.41***	0.32**	0.40***	0.31**
	(0.14)	(0.14)	(0.14)	(0.14)
Interest Rate	-0.19***	-0.03	-0.20***	-0.03
	(0.04)	(0.05)	(0.04)	(0.05)
Time to Maturity	0.08***	0.10***	0.08***	0.10***
	(0.01)	(0.01)	(0.01)	(0.01)
Constant	28.30***	61.08*	28.28***	59.95*
	(4.75)	(36.03)	(4.81)	(36.38)
Firm-Time Fixed Effects	YES	YES	YES	YES
Bank Fixed Effects	NO	YES	NO	YES
R-squared	0.15	0.17	0.15	0.17
Number of observations	49,967	49,967	49,967	49,967

TABLE 8

Likelihood to Make a Payment Delinquency on a Loan.
Sample of Firms with **both** Short and Long Relationships

The Table reports regression results from a linear probability model. The dependent variable is Delinquency that equals one when a loan is delinquent and zero otherwise. The sample is composed by 2,723 loan observations of firms that have both, loans with banks with which they have very short relationships (below the 25 percentile) and loans with banks with which they have very long relationships (above the 95 percentile). Column (I) report results of a model that includes relationship, bank and loan characteristics as independent variables, firm-time fixed effects are included. In Column (II) bank fixed effect are added. Long Relationship is an indicator variable that takes the value of one if the length of the relationship is above the 95 percentile (13 quarters). Definitions of the variables can be found in the Table 4. Coefficients are listed in the first row, robust standard errors that are corrected for clustering at the firm level are reported in the row below in parentheses, and the corresponding significance levels are in the adjacent column. Note: *** Significant at 1%, ** significant at 5%, * significant at 10%.

Dependent Variable	**Delinquency**	
Models	I	II
Relationship Characteristics		
Long Relationship	-11.53***	-8.40***
	(3.00)	(3.05)
Previous Delinquencies Same Bank	-2.32	1.46
	(7.74)	(7.80)
Previous Delinquencies Different Bank	-13.22**	-6.94
	(5.91)	(5.93)
Number of Loans	0.50	0.73
	(3.38)	(3.40)
Share of Wallet	0.06	0.06
	(0.07)	(0.07)
Bank Characteristics		
Foreign Bank	1.70	
	(3.59)	
State Owned Bank	-11.40	
	(8.42)	
Bank Size	0.06	
	(0.91)	
Loan Characteristics		
Collateral	15.60***	16.97***
	(2.20)	(2.31)
Ln Loan Amount	-0.78	-0.94
	(0.80)	(0.80)
Interest Rate	-0.15	0.07
	(0.21)	(0.22)
Time to Maturity	0.03	0.04
	(0.03)	(0.03)
Constant	31.83	-27.98*
	(20.94)	(14.56)
Firm-Time Fixed Effects	YES	YES
Bank Fixed Effects	NO	YES
R-squared	0.14	0.22
Number of observations	2 723	2,723

TABLE 9
Benefits of the Relationship and Cost of Loan Delinquencies.

The Table reports OLS regressions for a sample of 470.085 new loans. Columns I-IV report specifications for each of the loan characteristics: *Interest Rate*, *Collateral*, *Ln(loan amount)* and *Maturity*. The models include relationship and firm characteristics as independent variables. Bank x Time Fixed effects are included in all specifications. Definitions of the variables can be found in the Table 3 and the Table 4. Coefficients are listed in the first row, robust standard errors that are corrected for clustering at the firm level are reported in the row below in parentheses, and the corresponding significance levels are in the adjacent column. Note: *** Significant at 1%, ** significant at 5%, * significant at 10%.

Methodology	OLS			
Model	I	II	III	IV
Dependent Variable	Interest Rate	Collateral	ln(loan amount)	Maturity
Relationship Characteristics				
Length of Relationship	-0.09***	-0.06***	0.05***	-0.10***
	(0.00)	(0.02)	(0.00)	(0.01)
Previous Delinquencies to Bank	0.44***	3.84***	-0.20***	1.37***
	(0.08)	(0.45)	(0.03)	(0.17)
Share of Wallet	-0.03***	0.11***	0.02***	0.06***
	(0.00)	(0.00)	(0.00)	(0.00)
Firm Characteristics				
Previous Delinquent Loans	0.90***	2.54***	-0.12***	0.06
	(0.06)	(0.28)	(0.03)	(0.11)
Number of Lenders	-0.36***	0.57***	0.27***	0.40***
	(0.01)	(0.06)	(0.01)	(0.02)
Small Firm	3.55***	6.43***	-1.73***	0.66***
	(0.05)	(0.25)	(0.02)	(0.10)
Return on Equity (ROE)	-0.29***	1.78***	0.06**	-0.07
	(0.06)	(0.27)	(0.02)	(0.11)
Current Ratio (CR)	0.16***	-0.35***	-0.16***	-0.06**
	(0.01)	(0.06)	(0.01)	(0.03)
Debt to Equity Ratio	0.03***	0.26***	0.02***	-0.06***
	(0.01)	(0.03)	(0.00)	(0.01)
Firm Rating	-1.10***	1.19***	0.44***	-2.15***
	(0.05)	(0.25)	(0.02)	(0.19)
Constant	24.07***	9.08***	0.53***	19.94***
	(0.27)	(1.28)	(0.13)	(0.97)
Bank x Time Fixed Effects	YES	YES	YES	YES
R-squared	0.35	0.25	0.32	0.36
Number of observations	470,085	470,085	470,085	470,085

TABLE 10

Likelihood to Make a Payment Delinquency on a Loan.

Foreign vrs Domestic Banks. Private vrs State Owned Banks

The Table reports regression results from a linear probability model. The dependent variable is *Delinquency* that equals one when a loan is delinquent and zero otherwise. Column (I) report results for a sample of 28,922 loans of firms that have outstanding loans with both foreign and domestic banks. Column (II) report results for a sample of 8,774 loans of firms that have outstanding loans with both state owned and private banks. The models include relationship, bank and loan characteristics as independent variables. Firm x Time Fixed effects are included in all specifications. Definitions of the variables can be found in the Table 4. Coefficients are listed in the first row, robust standard errors that are corrected for clustering at the firm level are reported in the row below in parentheses, and the corresponding significance levels are in the adjacent column. Note: *** Significant at 1%, ** significant at 5%, * significant at 10%.

Dependent Variable	**Delinquency**	
Models	I	II
Relationship Characteristics		
Length of Relationship	-0.15***	-0.09
	(0.05)	(0.09)
Previous Delinquencies Same Bank	10.16***	7.69*
	(2.58)	(4.62)
Previous Delinquencies Different Bank	-8.06***	-12.69***
	(1.78)	(3.04)
Number of Loans	-2.33***	-3.09**
	(0.82)	(1.41)
Share of Wallet	-0.01	0.17***
	(0.02)	(0.05)
Bank Characteristics		
Foreign Bank	0.94	0.52
	(0.72)	(1.35)
State Owned Bank	4.57**	6.19***
	(1.82)	(1.64)
Bank Size	-0.30	0.19
	(0.24)	(0.39)
Loan Characteristics		
Collateral	10.04***	7.81***
	(0.58)	(0.98)
Ln Loan Amount	0.28	0.23
	(0.17)	(0.30)
Interest Rate	-0.19***	-0.16*
	(0.05)	(0.09)
Time to Maturity	0.08***	0.09***
	(0.01)	(0.02)
Constant	28.35***	14.45
	(5.46)	(8.88)
Firm x Time Fixed Effects	YES	YES
R-squared	0.13	0.15
Number of observations	28 922	8 774

TABLE 11
Determinants of Loan Contracts. Foreign vrs Domestic Banks

The Table reports OLS regressions for a sample of 144,107 new loans granted to firms that received a loan from at least one foreign and one domestic bank in the same quarter. Columns I-IV report specifications for each of the loan characteristics: *Interest Rate* (%), *Collateral* (%), *Maturity* (months) and *Ln(loan amount)*. The models include bank and relationship characteristics as independent variables. Firm x Time Fixed effects are included in all specifications. Definitions of the variables can be found in Table 4. Coefficients are listed in the first row, robust standard errors that are corrected for clustering at the firm level are reported in the row below in parentheses, and the corresponding significance levels are in the adjacent column. Note: *** Significant at 1%, ** significant at 5%, * significant at 10%.

Methodology	OLS			
Model	I	II	III	IV
Dependent Variable	Interest Rate	Collateral	Maturity	ln(loan amount)
Bank Characteristics				
Foreign Bank	-0.37***	-9.73***	-5.27***	-0.15***
	(0.07)	(0.39)	(0.17)	(0.02)
Bank Size	-0.12***	-6.40***	-2.49***	0.03***
	(0.03)	(0.24)	(0.10)	(0.01)
Relationship Characteristics				
Length of Relationship	0.07***	0.18***	-0.14***	0.00
	(0.01)	(0.03)	(0.02)	(0.00)
Previous Delinquencies to Bank	-0.53***	5.87***	2.38***	-0.13**
	(0.17)	(1.03)	(0.51)	(0.06)
Share of Wallet	-0.07***	0.22***	0.08***	0.06***
	(0.00)	(0.01)	(0.01)	(0.00)
Constant	18.92***	159.13***	67.50***	3.48***
	(0.70)	(5.36)	(2.25)	(0.18)
Firm x Time Fixed Effects	YES	YES	YES	YES
R-squared	0.53	0.36	0.37	0.67
Number of observations	144,107	144,107	144,107	144,107

TABLE 12
Determinants of Loan Contracts. State Owned vrs Private Banks

The Table reports OLS regressions for a sample of 3,024 new loans granted to firms that received a loan from at least one state owned bank and one private bank in the same quarter. Columns I-IV report specifications for each of the loan characteristics: Interest Rate (%), Collateral (%), Maturity (months) and Ln(loan amount). The models include bank and relationship characteristics as independent variables. Firm x Time Fixed effects are included in all specifications. Definitions of the variables can be found in Table 4. Coefficients are listed in the first row, robust standard errors that are corrected for clustering at the firm level are reported in the row below in parentheses, and the corresponding significance levels are in the adjacent column. Note: *** Significant at 1%, ** significant at 5%, * significant at 10%.

Methodology	Linear Probability Model			
Model	I	II	III	IV
Dependent Variable	Interest Rate	Collateral	Maturity	ln(loan amount)
Bank Characteristics				
State Owned Bank	-0.23**	-3.81***	-2.07***	-0.23***
	(0.12)	(0.85)	(0.28)	(0.05)
Bank Size	-0.05	-5.87***	-2.93***	-0.01
	(0.05)	(0.39)	(0.17)	(0.01)
Relationship Characteristics				
Length of Relationship	0.09***	0.05	-0.19***	-0.00
	(0.01)	(0.07)	(0.03)	(0.00)
Previous Delinquencies to Bank	-0.22	7.07***	3.68***	-0.11
	(0.29)	(1.96)	(0.91)	(0.09)
Share of Wallet	-0.08***	0.29***	0.12***	0.07***
	(0.00)	(0.02)	(0.01)	(0.00)
Constant	17.10***	146.73***	75.93***	4.34***
	(1.08)	(8.68)	(3.84)	(0.31)
Firm x Time Fixed Effects	YES	YES	YES	YES
R-squared	0.51	0.32	0.37	0.69
Number of observations	3,024	3,024	3,024	3,024

TABLE 13

Likelihood to Make a Payment Delinquency on a Loan. Conditional Logit Model.

The Table reports regression results from a Conditional Logit model. The dependent variable is *Delinquency* that equals one when a loan is delinquent and zero otherwise. The model includes relationship, bank and loan characteristics as independent variables. Definitions of the variables can be found in the Table 3 and the Table 4. Odds ratios are listed in the first row, robust standard errors that are corrected for clustering at the firm level are reported in the row below in parentheses, and the corresponding significance levels are in the adjacent column. Note: *** Significant at 1%, ** significant at 5%, * significant at 10%.

Dependent Variable	**Delinquency**		
Models	I	II	III
Relationship Characteristics			
Length of Relationship	-0.01***	-0.01***	
	(0.00)	(0.00)	
Previous Delinquencies Same Bank	0.22**	0.19*	
	(0.10)	(0.10)	
Previous Delinquencies Different Bank	-0.66***	-0.57***	
	(0.08)	(0.09)	
Number of Loans	-0.18***	-0.21***	
	(0.04)	(0.04)	
Share of Wallet	-0.00	-0.00	
	(0.00)	(0.00)	
Bank Characteristics			
Foreign Bank	0.06*		
	(0.04)		
State Owned Bank	0.30***		
	(0.07)		
Bank Size	-0.00		
	(0.01)		
Loan Characteristics			
Dummy Collateral	0.59***	0.68***	1.13***
	(0.02)	(0.03)	(0.07)
Ln Loan Amount	0.03***	0.02***	0.18***
	(0.01)	(0.01)	(0.04)
Interest Rate	-0.01***	-0.00	-0.02**
	(0.00)	(0.00)	(0.01)
Time to Maturity	0.00***	0.01***	0.06***
	(0.00)	(0.00)	(0.01)
Firm-Time Fixed Effects	YES	YES	NO
Bank Fixed Effects	NO	YES	NO
Firm-Bank-Time Fixed Effects	NO	NO	YES
Number of observations	49,967	49,967	3,728

TABLE 14

Likelihood to Make a Payment Delinquency on a Loan. Probit Model.

The Table reports regression results from a Probit model. The dependent variable is *Delinquency* that equals one when a loan is delinquent and zero otherwise. Column I shows the results for the sample of firms that face moderate liquidity constrains, Column II adds the sample of firms that face extreme liquidity constrains and Column III adds firms that face few or no liquidity constrains (it corresponds to the population of loans). The model includes relationship, bank, loan, firm and macroeconomic characteristics as independent variables. Definitions of the variables can be found in the Table 3 and the Table 4. Coefficients are listed in the first row, robust standard errors that are corrected for clustering at the firm level are reported in the row below in parentheses, and the corresponding significance levels are in the adjacent column. Note: *** Significant at 1%, ** significant at 5%, * significant at 10%.

Dependent Variable	**Delinquency**		
Methodology		**Probit**	
Models	I	II	III
Relationship Characteristics			
Length of Relationship	-0.13***	-0.15***	-0.03***
	(0.03)	(0.03)	(0.00)
Previous Delinquencies Same Bank	7.46***	9.20***	-0.06
	(1.23)	(1.29)	(0.06)
Previous Delinquencies Different Bank	-10.25***	-10.66***	-0.68***
	(0.77)	(0.85)	(0.03)
Number of Loans	-6.09***	-9.77***	0.08***
	(0.50)	(0.52)	(0.02)
Share of Wallet	0.11***	0.29***	0.00
	(0.01)	(0.01)	(0.00)
Bank Characteristics			
Foreign Bank	0.77	0.57	0.15***
	(0.60)	(0.63)	(0.03)
State Owned Bank	4.80***	4.33***	0.30***
	(1.29)	(1.33)	(0.06)
Bank Size	-0.10	-0.13	0.11***
	(0.15)	(0.15)	(0.01)
Loan Characteristics			
Collateral	10.33***	10.77***	0.76***
	(0.38)	(0.40)	(0.02)
Ln Loan Amount	-0.14	-0.98***	0.00
	(0.09)	(0.09)	(0.00)
Interest Rate	-0.10***	-0.09***	0.01***
	(0.03)	(0.03)	(0.00)
Time to Maturity	0.07***	0.07***	0.00***
	(0.01)	(0.01)	(0.00)

TABLE 14 (continued)
Likelihood to Make a Payment Delinquency on a Loan. Probit Model.

Models	I	II	III
Firm Characteristics			
Previous Delinquent Loans	6.70***	6.26***	2.09***
	(0.83)	(0.89)	(0.13)
Number of Lenders	-2.37***	-2.47***	-0.01**
	(0.10)	(0.11)	(0.01)
Small Firm	0.99***	-0.44	0.41***
	(0.30)	(0.32)	(0.03)
Return on Equity (ROE)	-2.74***	-3.15***	-0.47***
	(0.45)	(0.49)	(0.03)
Current Ratio (CR)	0.05	0.27***	-0.02***
	(0.08)	(0.09)	(0.01)
Debt to Equity Ratio	-0.06	-0.07*	0.01***
	(0.04)	(0.04)	(0.00)
Macroeconomic Characteristics			
GDP Growth	23.96***	28.89***	-4.34***
	(4.65)	(5.10)	(0.34)
Arrears in **some** loans	YES	YES	YES
Arrears in **all** loans	NO	YES	YES
Arrears in **no** loan	NO	NO	YES
Average Likelihood	21.3%	23.6%	0.9%
Number of observations	49,967	51,997	1,276,502

TABLE 15
Likelihood to Make a Payment Delinquency on a Loan.
Interactions with Habeas Data Law

The Table reports regression results from a linear probability model. The dependent variable is Delinquency that equals one when a loan is delinquent and zero otherwise. Column (I) report results of a model that includes relationship, bank and loan characteristics as independent variables, firm-time fixed effects are included. The variables are interacted with a dummy variables Habeas Data, which takes the value of one from the date where the Habeas Data Law was introduced (December 2008) and zero before that date. In Column (II) bank fixed effect are added. In Column (III) firm-bank-time fixed effects are included. Definitions of the variables can be found in the Table 4. Coefficients are listed in the first row, robust standard errors that are corrected for clustering at the firm level are reported in the row below in parentheses, and the corresponding significance levels are in the adjacent column. Note: *** Significant at 1%, ** significant at 5%, * significant at 10%.

Dependent Variable	**Delinquency**		
Models	I	II	III
Relationship Characteristics			
Length of Relationship	-0.11*	-0.06	
	(0.06)	(0.06)	
Length of Relationship x Habeas Data	-0.19**	-0.20**	
	(0.09)	(0.09)	
Previous Delinquencies Same Bank	12.66***	12.02***	
	(2.74)	(2.75)	
Previous Delinquencies Same Bank x Habeas Data	-6.66	-6.59	
	(4.17)	(4.09)	
Previous Delinquencies Different Bank	11.47***	10.34***	
	(1.95)	(1.98)	
Previous Delinquencies Different Bank x Habeas Data	1.59	3.45	
	(2.93)	(2.87)	
Number of Loans	-2.65***	-2.01**	
	(0.91)	(0.91)	
Number of Loans x Habeas Data	-1.87	-3.75***	
	(1.45)	(1.39)	
Share of Wallet	0.07***	0.07***	
	(0.02)	(0.02)	
Share of Wallet x Habeas Data	-0.11***	-0.11***	
	(0.04)	(0.03)	

TABLE 15 (continued)
Likelihood to Make a Payment Delinquency on a Loan.
Interactions with Habeas Data Law

Models	I	II	III
Bank Characteristics			
Foreign Bank	-0.72		
	(0.88)		
Foreign Bank x Habeas Data	5.53***		
	(1.58)		
State Owned Bank	6.39***		
	(1.82)		
State Owned Bank x Habeas Data	-2.28		
	(4.13)		
Bank Size	0.65**		
	(0.27)		
Bank Size x Habeas Data	-1.82***		
	(0.43)		
Loan Characteristics			
Dummy Collateral	10.43***	11.04***	44.66***
	(0.62)	(0.66)	(4.47)
Dummy Collateral x Habeas Data	2.77***	4.61***	8.41
	(1.00)	(0.98)	(7.33)
Ln Loan Amount	0.53***	0.47***	3.89***
	(0.17)	(0.17)	(1.16)
Ln Loan Amount x Habeas Data	-0.43	-0.49	-1.65
	(0.31)	(0.30)	(2.32)
Interest Rate	-0.15***	-0.04	-0.28
	(0.05)	(0.06)	(0.41)
Interest Rate x Habeas Data	-0.09	0.06	-0.04
	(0.09)	(0.09)	(0.77)
Time to Maturity	0.08***	0.11***	1.31***
	(0.01)	(0.01)	(0.23)
Time to Maturity x Habeas Data	-0.00	-0.01	-0.45
	(0.02)	(0.02)	(0.33)
Constant	26.10***	63.58*	3.01
	(4.76)	(36.56)	(8.77)
Firm-Time Fixed Effects	YES	YES	NO
Bank Fixed Effects	NO	YES	NO
Firm-Bank-Time Fixed Effects	NO	NO	YES
R-squared	0.15	0.18	0.5
Number of observations	49 967	49 967	3 728

TABLE 16
Likelihood to Make a Payment Delinquency on a Loan.
Interactions with Loan Term Distress

The Table reports regression results from a Linear Probability model. The dependent variable is Delinquency that equals one when a loan is delinquent and zero otherwise. The model includes relationship, bank and loan characteristics as independent variables. Interactions with the variable Long Term Distress are included in order to determine differences in the delinquency decisions related to length of the period of distress of the firm. Definitions of the variables can be found in the Table 2 and the Table 3. Coefficients are listed in the first row, robust standard errors that are corrected for clustering at the firm level are reported in the row below in parentheses, and the corresponding significance levels are in the adjacent column. Note: *** Significant at 1%, ** significant at 5%, * significant at 10%.

Dependent Variable			
Methodology	**Linear Probability Model**		
Models	I	II	III
Relationship Characteristics			
Length of Relationship	-0.23***	-0.17***	
	(0.05)	(0.05)	
Length of Relationship x Long Term Distress	0.05	0.10	
	(0.15)	(0.15)	
Previous Delinquencies Same Bank	10.80***	9.93***	
	(2.25)	(2.24)	
Previous Delinquencies Same Bank x Long Term Distress	-7.02	-5.25	
	(6.15)	(6.12)	
Previous Delinquencies Different Bank	-10.79***	-9.04***	
	(1.66)	(1.66)	
Previous Delinquencies Different Bank x Long Term Distress	0.12	0.48	
	(4.06)	(3.96)	
Number of Loans	-2.69***	-3.22***	
	(0.76)	(0.77)	
Number of Loans x Long Term Distress	-6.11***	-4.48**	
	(2.34)	(2.20)	
Share of Wallet	0.02	0.03	
	(0.02)	(0.02)	
Share of Wallet x Long Term Distress	0.06	0.06	
	(0.07)	(0.07)	
Bank Characteristics			
Foreign Bank	1.52**		
	(0.77)		
Foreign Bank x Long Term Distress	-1.76		
	(2.40)		
State Owned Bank	6.49***		
	(1.76)		
State Owned Bank x Long Term Distress	-3.26		
	(5.06)		
Bank Size	-0.22		
	(0.22)		
Bank Size x Long Term Distress	1.15		
	(0.71)		

TABLE 16 (continued)
Likelihood to Make a Payment Delinquency on a Loan.
Interactions with Loan Term Distress

Models	I	II	III
Loan Characteristics			
Dummy Collateral	11.69***	13.14***	47.54***
	(0.52)	(0.57)	(3.72)
Dummy Collateral x Long Term Distress	-2.80*	-3.20**	-0.29
	(1.60)	(1.52)	(10.74)
Ln Loan Amount	0.27*	0.17	2.89***
	(0.15)	(0.15)	(1.02)
Ln Loan Amount x Long Term Distress	1.94***	2.11***	6.54*
	(0.61)	(0.60)	(3.69)
Interest Rate	-0.21***	-0.05	-0.41
	(0.05)	(0.05)	(0.37)
Interest Rate x Long Term Distress	0.18	0.23	1.25
	(0.14)	(0.14)	(0.86)
Time to Maturity	0.08***	0.11***	1.09***
	(0.01)	(0.01)	(0.17)
Time to Maturity x Long Term Distress	-0.01	-0.02	0.64*
	(0.02)	(0.02)	(0.36)
Constant	28.15***	61.99*	1.80
	(4.75)	(36.52)	(8.53)
Firm-Time Fixed Effects	YES	YES	NO
Bank Fixed Effects	NO	YES	NO
Firm-Bank-Time Fixed Effects	NO	NO	YES
R-squared	0.15	0.17	0.49
Number of observations	49,967	49,967	3,728

APPENDIX TABLE A.1

Likelihood to Make a Payment Delinquency on a Loan. Various Robustness

The Table reports regression results from a linear probability model. The dependent variable is *Delinquency* that equals one when a loan is delinquent and zero otherwise. Definitions of the independent variables can be found in the Table 4. Columns (I) and (II) present the results of the main specifications using as an alternative measure of Length of the relationship the *Number of Old and New Loans*. Columns (III) and (IV) present the results for a sample of firms that have had more than one loan with each of their relationship banks. Coefficients are listed in the first row, robust standard errors that are corrected for clustering at the firm level are reported in the row below in parentheses, and the corresponding significance levels are in the adjacent column. Note: *** Significant at 1%, ** significant at 5%, * significant at 10%.

Dependent Variable	**Delinquency**			
Models	I	II	III	IV
Relationship Characteristics				
Number of old and new loans	-0.60***	-0.55***	-0.62***	-0.59***
	(0.05)	(0.05)	(0.09)	(0.09)
Previous Delinquencies Same Bank	10.02***	9.28***	13.41***	13.49***
	(2.11)	(2.10)	(3.57)	(3.56)
Previous Delinquencies Different Bank	-10.50***	-9.02***	-7.83***	-5.14**
	(1.51)	(1.51)	(2.56)	(2.59)
Share of Wallet	0.02	0.02	0.06*	0.05*
	(0.02)	(0.02)	(0.03)	(0.03)
Bank Characteristics				
Foreign Bank	1.94***		2.40	
	(0.72)		(1.58)	
State Owned Bank	5.76***		6.61*	
	(1.63)		(3.73)	
Bank Size	0.13		1.34***	
	(0.21)		(0.48)	
Loan Characteristics				
Collateral	10.92***	12.46***	13.62***	15.63***
	(0.50)	(0.55)	(0.97)	(1.04)
Ln Loan Amount	0.60***	0.54***	0.50*	0.46*
	(0.14)	(0.14)	(0.27)	(0.27)
Interest Rate	-0.18***	-0.02	-0.33***	-0.08
	(0.04)	(0.05)	(0.09)	(0.09)
Time to Maturity	0.07***	0.11***	0.11***	0.14***
	(0.01)	(0.01)	(0.02)	(0.02)
Constant	19.16***	57.97	-3.88	-20.42***
	(4.88)	(36.75)	(11.32)	(2.28)
Firm-Time Fixed Effects	YES	YES	YES	YES
Bank Fixed Effects	NO	YES	NO	YES
Firm-Bank-Time Fixed Effects	NO	NO	NO	NO
R-squared	0.15	0.18	0.16	0.19
Number of observations	49,983	49,983	15,591	15,591
Type of Robustness	Alternative measure of relationship.		More than one loan observed per relationship.	

APPENDIX TABLE A.2

Likelihood to Make a Payment Delinquency on a Loan. Various Robustness

The Table reports regression results from a linear probability model. The dependent variable is *Delinquency* that equals one when a loan is delinquent and zero otherwise. Definitions of the independent variables can be found in the Table 4. Columns (I) and (II) present the results of the main specifications including *Collateralization* instead of *Collateral,* Column (I) in addition includes an interaction term between *Foreign Bank* and *Greenfield Investment*. Columns (III) and (IV) includes the *Number of Previous Delinquencies Same Bank* instead of the binary variables for previous delinquencies. Coefficients are listed in the first row, robust standard errors that are corrected for clustering at the firm level are reported in the row below in parentheses, and the corresponding significance levels are in the adjacent column. Note: *** Significant at 1%, ** significant at 5%, * significant at 10%.

Dependent Variable	**Delinquency**			
Models	I	II	III	V
Relationship Characteristics				
Length of Relationship	-0.26***	-0.23***	-0.18***	-0.12***
	(0.05)	(0.05)	(0.05)	(0.05)
Number of Previous Delinquencies Same Bank			4.86***	4.15***
			(0.56)	(0.53)
Previous Delinquencies Same Bank	9.84***	9.11***		
	(2.10)	(2.10)		
Previous Delinquencies Different Bank	-10.98***	-9.09***		
	(1.51)	(1.52)		
Number of Loans	-1.68**	-1.74**	-3.28***	-3.64***
	(0.72)	(0.73)	(0.73)	(0.74)
Share of Wallet	0.00	0.02	0.03	0.03*
	(0.00)	(0.02)	(0.02)	(0.02)
Bank Characteristics				
Foreign Bank	-1.75**		1.23*	
	(0.74)		(0.74)	
Foreign Bank * Greenfield Investment	14.21***			
	(2.48)			
State Owned Bank	4.98***		6.25***	
	(1.65)		(1.69)	
Bank Size	-0.41*		-0.13	
	(0.21)		(0.21)	
Loan Characteristics				
Collateralization	4.31***	4.49***		
	(0.29)	(0.32)		
Collateral			11.58***	12.93***
			(0.50)	(0.55)
Ln Loan Amount	0.95***	0.83***	0.41***	0.33**
	(0.14)	(0.14)	(0.14)	(0.14)
Interest Rate	-0.00***	-0.15***	-0.20***	-0.03
	(0.00)	(0.05)	(0.04)	(0.05)
Time to Maturity	0.09***	0.12***	0.08***	0.11***
	(0.01)	(0.01)	(0.01)	(0.01)
Constant	34.86***	66.93*	24.96***	60.56
	(4.86)	(39.04)	(4.80)	(36.97)
Firm-Time Fixed Effects	YES	YES	YES	YES
Bank Fixed Effects	NO	YES	NO	YES
Firm-Bank-Time Fixed Effects	NO	NO	NO	NO
R-squared	0.15	0.18	0.16	0.19
Number of observations	49,983	49,983	49,983	49,983

APPENDIX TABLE A.3
Likelihood to Make a Payment Delinquency on a Loan,
Making use of the Number of Days of Delinquency

The Table reports regression results from a linear probability model. The dependent variable is *Delinquency* that equals one when a loan is delinquent and zero otherwise. Importantly, the number of days of delinquency (instead of the change of rating) is used to determine whether a loan is delinquent. Column (I) report results of a model that includes relationship, bank and loan characteristics as independent variables, firm-time fixed effects are included. In Column (II) bank fixed effect are added. In Column (III) firm-bank-time fixed effects are included. Definitions of the variables can be found in the Table 4. Coefficients are listed in the first row, robust standard errors that are corrected for clustering at the firm level are reported in the row below in parentheses, and the corresponding significance levels are in the adjacent column. Note: *** Significant at 1%, ** significant at 5%, * significant at 10%.

Dependent Variable	**Delinquency**		
Models	I	II	III
Relationship Characteristics			
Length of Relationship	-0.16***	-0.09*	
	(0.05)	(0.05)	
Previous Delinquencies Same Bank	7.46***	7.78***	
	(1.94)	(1.90)	
Previous Delinquencies Different Bank	-11.95***	-10.21***	
	(1.10)	(1.09)	
Number of Loans	-10.07***	-7.38***	
	(0.79)	(0.80)	
Share of Wallet	-0.03	-0.04*	
	(0.02)	(0.02)	
Bank Characteristics			
Foreign Bank	-2.27***		
	(0.87)		
State Owned Bank	-0.18		
	(2.02)		
Bank Size	-3.20***		
	(0.28)		
Loan Characteristics			
Dummy Collateral	5.35***	3.85***	9.73*
	(0.63)	(0.66)	(5.01)
Ln Loan Amount	0.53***	0.56***	6.76***
	(0.18)	(0.19)	(1.38)
Interest Rate	-0.24***	-0.30***	-0.89
	(0.05)	(0.06)	(0.55)
Time to Maturity	0.04***	0.02	0.32***
	(0.01)	(0.01)	(0.10)
Constant	112.57***	8.23***	31.01**
	(6.19)	(1.79)	(13.36)
Firm-Time Fixed Effects	YES	YES	NO
Bank Fixed Effects	NO	YES	NO
Firm-Bank-Time Fixed Effects	NO	NO	YES
R-squared	0.16	0.20	0.11
Number of observations	33,319	33,319	2,414

APPENDIX TABLE A.4

Choice Between Repayment, Renegotiation and Delinquency. Multinomial Logit Model.

The Table reports the marginal effects of a Multinomial Logit Model. The categorical dependent variable takes the value of 0 if the loan is repaid, 1 if the loan is renegotiated and 2 if the loan starts an arrear. The base outcome is set the repayment of the loan. The columns present the marginal effects of each of the other outcomes with respect to the base outcome. The model includes relationship, bank, loan, firm and macroeconomic characteristics as independent variables. Definitions of the variables can be found in the Table 3 and the Table 4. Coefficients are listed in the first row, robust standard errors that are corrected for clustering at the firm level are reported in the row below in parentheses, and the corresponding significance levels are in the adjacent column. Note: *** Significant at 1%, ** significant at 5%, * significant at 10%.

Methodology	**Multinomial Logit**	
Outcome	Renegotiation	Delinquency
Relationship Characteristics		
Length of Relationship	-0.13***	-0.09***
	(0.02)	(0.03)
Previous Delinquencies Same Bank	1.2*	6.12***
	(0.64)	(0.97)
Previous Delinquencies Different Bank	0.24	-10.9***
	(0.5)	(0.86)
Previous Renegotiations Same Bank	7.39***	-1.64***
	(0.23)	(0.52)
Number of Loans	-0.19	-5.67***
	(0.24)	(0.48)
Share of Wallet	-0.01	0.1***
	(0.01)	(0.01)
Bank Characteristics		
Foreign Bank	0.99***	1.14**
	(0.24)	(0.57)
State Owned Bank	-1.15*	4.47***
	(0.7)	(1.09)
Bank Size	0.56***	-0.1
	(0.08)	(0.14)
Loan Characteristics		
Collateral	-2.89***	9.41***
	(0.25)	(0.36)
Ln Loan Amount	0.55***	-0.07
	(0.06)	(0.09)
Interest Rate	0.1***	-0.09***
	(0.02)	(0.03)
Time to Maturity	-0.25***	0.1***
	(0.01)	(0.01)

TABLE A.4 (continued)
Choice Between Repayment, Renegotiation and Delinquency. Multinomial Logit Model.

	Renegotiation	Delinquency
Firm Characteristics		
Previous Delinquent Loans	-0.39	6.28***
	(0.49)	(0.73)
Number of Lenders	0.04	-2.51***
	(0.04)	(0.1)
Small Firm	0.36	0.75***
	(0.25)	(0.27)
Return on Equity (ROE)	0.56**	-2.56***
	(0.27)	(0.42)
Current Ratio (CR)	-0.08	0.04
	(0.08)	(0.07)
Debt to Equity Ratio	0.00	-0.05
	(0.03)	(0.04)
Macroeconomic Characteristics		
GDP Growth	-35.58***	20.83***
	(3.6)	(4.28)
Pseudo R2	0.11	
Marginal Percentage	5.38	23.26
Number of observations	49,967	

APPENDIX TABLE A.5

Likelihood to Make a Payment Delinquency on a Loan.

Includes *Previous Renegotiations Same Bank* as An Additional Relationship Characteristic

The Table reports regression results from a linear probability model. The dependent variable is *Delinquency* that equals one when a loan is delinquent and zero otherwise. Column (I) report results of a model that includes relationship, bank and loan characteristics as independent variables, firm-time fixed effects are included. Among the relationship characteristics *Previous Renegotiations Same Bank* is included. Column (II) includes *Number of Previous Renegotiations Same Bank*. In Column (III) bank fixed effect are added. Definitions of the variables can be found in the Table 4. Coefficients are listed in the first row, robust standard errors that are corrected for clustering at the firm level are reported in the row below in parentheses, and the corresponding significance levels are in the adjacent column. Note: *** Significant at 1%, ** significant at 5%, * significant at 10%.

Dependent Variable	**Delinquency**		
Models	I	II	III
Relationship Characteristics			
Length of Relationship	-0.17***	-0.16***	-0.17***
	(0.05)	(0.05)	(0.05)
Previous Delinquencies Same Bank	10.29***	10.37***	9.52***
	(2.12)	(2.12)	(2.10)
Previous Delinquencies Different Bank	-10.53***	-10.37***	-8.88***
	(1.54)	(1.54)	(1.52)
Previous Renegotiations Same Bank	-3.12***		
	(0.67)		
Number of Previous Renegotiations Same Bank		-1.15***	
		(0.18)	
Number of Loans	-3.11***	-3.13***	-3.64***
	(0.72)	(0.72)	(0.73)
Share of Wallet	0.00	0.00	0.00*
	(0.00)	(0.00)	(0.00)
Bank Characteristics			
Foreign Bank	1.72**	1.89**	
	(0.73)	(0.73)	
State Owned Bank	6.30***	6.31***	
	(1.64)	(1.64)	
Bank Size	-0.05	-0.08	
	(0.21)	(0.21)	
Loan Characteristics			
Collateral	11.19***	11.22***	12.87***
	(0.50)	(0.50)	(0.54)
Ln Loan Amount	0.46***	0.46***	0.34**
	(0.14)	(0.14)	(0.14)
Interest Rate	-0.00***	-0.00***	-0.00
	(0.00)	(0.00)	(0.00)
Time to Maturity	0.08***	0.08***	0.11***
	(0.01)	(0.01)	(0.01)
Constant	26.51***	26.76***	61.70*
	(4.76)	(4.76)	(36.47)
Firm-Time Fixed Effects	YES	YES	YES
Bank Fixed Effects	NO	NO	YES
Firm-Bank-Time Fixed Effects	NO	NO	NO
R-squared	0.15	0.15	0.18
Number of observations	49,967	49,967	49,967

Impact of a Decrease on Credit Bureaus' Memory on the Behavior of Borrowers and Lenders

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Impact of a Decrease on Credit Bureaus' Memory

on the Behavior of Borrowers and Lenders

Abstract

Around the globe, credit bureaus restrict the length of time that negative credit information of firms can be retained. The large variance in retention times across industrialized countries illustrates the lack of consensus on the optimal memory of negative information. By exploiting a variation in retention time of negative information for firms, provided by the introduction of the Habeas Data law in Colombia, we are able to analyze the causal link between the length of the credit bureaus retention time and the subsequent behavior by lenders and borrowers. The law was ratified in 2009 and prohibited institutions in Colombia to access the entire credit history of borrowers. Since then, the negative credit information is observable only for a period that depends on the length of the delinquency period. Our results, suggest that after the introduction of the Habeas Data law: i) the duration of loan delinquency periods are longer, ii) firms seem to strategically wait long enough, until their negative records disappear from the credit bureaus, before switching banks, iii) banks grant loans with higher interest rates and lower collateral requirements.

JEL Codes: C41, D22, D81, D91, G21, G38
Key words: Information sharing, business loans, payment defaults, bank switch.

I. INTRODUCTION

The optimal design of a credit bureau is of great economic importance as it diminishes asymmetric information problems between lenders and borrowers. Through the collection of information shared by lenders[1], credit bureaus can reduce adverse selection problems by making more accurate predictions of borrowers' repayment probabilities (Pagano and Japelli (1993)). Moreover, as the performance of borrowers is shared among lenders moral hazard problems are mitigated by reinforcing borrowers' incentives to perform (Padilla and Pagano (2000), Jappelli (2002)). Thereby the information sharing through the credit bureau influences both the credit allocation and the level of investment of a country.

During financial crises and economic downturns a large number of countries had experience rising rates of firms' late payments and default on debt. Records of these arrears on the firms' credit file typically have serious consequences for credit scores and for access to credit. Any arrear on the credit file is likely to result in a bad credit score. While credit scores worsen, the firms credit access is substantially reduced, and this in turn can hamper the firm's ability to dampen the effect when faced with unexpected cost or revenue shocks. In addition, it can make the firm possibility to investment optimal more difficult. Therefore, to mitigate potential negative effects from retaining negative information for too long, most countries have laws that mandate the removal of negative information from credit bureau files after a certain retention period. The length of the retention period however varies largely across industrialized countries: Negative information is mandated to be removed from a borrower's credit report after seven years in the United States and three years in

[1] Information is shared mainly through public credit registries and private credit bureaus. Public credit registers are government-managed databases of borrowers' credit information in a financial system. They are available in more than 71 countries. Private credit bureaus are private firms or nonprofits organizations that collect credit information in a financial system. Their main role is to facilitate exchange of information among financial entities. They are available in more than 55 countries (Djankov, McLiesh, and Shleifer (2007)).

Sweden for example (Bottero and Spagnolo (2011)). This illustrates the lack of consensus on the optimal memory of negative information.

This project aims to identify the impact of the time credit bureaus remember a firms' negative credit information for the financial system and its actors. By exploiting a quasi-experimental variation in the credit bureaus retention time, provided by the introduction of the Habeas Data law in Colombia, the project will explore the following research questions: i) does a reduction/increase in the length of the credit bureaus retention time increase/reduce the firms' default risk? ii) does it affect the availability of bank credit for firms that have had non-performing loans? Is the likelihood to get a new loan from an existing relationship (*inside bank*) or a new relationship (*outside bank*) affected? iii) Do lenders alter their lending strategies and if so in what manner? These research questions are highly policy relevant and are nearly unexplored in the finance literature. This paper creates new insights that lead to an improved understanding of the role of retention times for the financial system and its actors that might open up the possibility to formulate more research based policies.

The Habeas Data law was introduced in Colombia with the aim to protect the rights to be forgotten and forgiven of the borrowers of the financial system. Before 2008 (*Old Regime*), financial institutions in Colombia were able to access a firm's entire credit history through the credit bureaus. Both positive and negative credit information was available through different portals. After the introduction of the Habeas Data law (*New Regime*), the negative information of a loan is observable only for a period that depends on the length of the delinquency period. According to the law, borrowers that have arrears for a period of less than two years stay in the portals for a period equal to twice the duration of the delinquency period. However, if a borrower has arrears for more than two years the maximum retention time is four years. Finally, if the borrower never repays a loan, the negative information remains in the portals for 10 years.

The amount of information shared varies from country to country. In some countries, such as Germany and South Arabia the credit register contains only limited information on outstanding loans of large borrowers. In other countries, such as Bolivia, Colombia, Ecuador, Malaysia and Taiwan the credit registers contain extensive information for all borrowers, including in some cases loan terms, ratings

and late payments, among others (Djankov, McLiesh and Shleifer (2007)). Using information on private credit bureaus and public credit registers around the world, Jappelli and Pagano (2002) find that information sharing indicators are positively correlated with bank lending and negatively correlated with default rates. They also find that private and public information sharing systems have no differential correlation on credit market performance. Moreover, exploring the public credit registers of Argentina, Brazil and Mexico, Majnoni, Miller, Mylenko and Powell (2004) find that public credit registers may improve credit access for borrowers for the same level of bank risk or reduce bank risk for the same level of credit access. Similarly, Brown, Jappelli and Pagano (2008) find that information sharing is associated with improved availability and lower cost of credit, and Love and Mylenko (2003) find that the existence of private credit registries is associated with lower financing constraints and higher share of bank borrowing in firm's financing structure.

Information sharing, however, might slow the pace of recovery of a country after economic downturns. Credit scores typically worsen during downturns and as a result, the credit access is substantially reduced. Hertzberg, Liberti and Paravisini (2011) provide evidence that information sharing exacerbates lender coordination and increases the incidence of firm financial distress. The mechanism is that lenders to a firm close to distress have incentives to coordinate: lower financing by one lender reduces firm creditworthiness and causes other lenders to reduce financing. Moreover, Vercammen (1995) provides an alternative mechanism by which long credit histories are not optimal. He shows that even though reputational effects are desirable from an efficiency perspective, they are generally not sustainable over time for a given cohort of borrowers. The reason is that when lenders are prevented from looking too far into a borrower's past, borrowers continually have an incentive to perform because there is always some scope for altering lender's believes. In other words, it prevents borrowers from exert less effort once a strong good reputation is built.

Despite the prevalence and importance of the length of retention times for creditors, borrowers, and policy makers there is little research on this topic. Bos and Nakamura (2011) using a sample of Swedish households loans analyze the impact of a reduction in the retention times from more than three years to exactly three years. They find that a reduced retention time decreases the need for and access to credit for consumers but

increases the likelihood to default. Ioannidou and Ongena (2010) using the Bolivian credit registry between 1999 and 2003, find that a relatively short retention time of two-months encourages bad borrowers to strategically switch to new banks after making their due payments for those two months. Thus, *outside banks* still suffer from adverse selection. The reason why the optimal memory is so hard to analyze is the difficulty in observing the counterfactual: "What would have happened with the firm if negative information was removed earlier/later from its credit file?" As Elul and Gottardi (2007) theoretically point out, forgetting a default typically makes incentives worse, ex-ante, because it reduces the expected length of the time period during which lenders can penalize a borrower for a past default. However, following a default, it may be good to forget, because by improving a firms' reputation, forgetting increases the incentive to exert effort to preserve this reputation.

In this paper we study the effect of a unique retention rule that defines the retention time as a function of the length of delinquency period. For our analysis we use a unique credit register of commercial loans from Colombia. It is collected by the *Superintendecia Financiera de Colombia* for research and regularity purposes. It has the advantage that it allows us to access some private information about borrower risk that is unobserved by the lender, in particular the entire credit history of a firm (all positive and negative information is included).

Our analysis is divided in three parts. In the first part, using duration models we analyze whether firms are more prone to stop making payments on their loans after the Habeas Data law. We find that the likelihood that a new loan becomes delinquent decreases after the introduction of the law. However, we also find that the likelihood that a delinquent loan is repaid decreases after the introduction of the law. In other words, even though the number of new loans that become delinquent seems to decrease, the length of the delinquency period increases (despite observable better financial conditions of the non-performing firms). This is consistent with the disciplinary role of information sharing among lenders (Jappelli and Pagano (1993), Padilla and Pagano (1997, 2000)). If creditors are known to share information of loan payment defaults, borrowers realize that defaulting in one lender will damage their rating with all other potential sources of credit and due to that, they will try harder to avoid default. As shown by Padilla and Pagano (2000), however, the intensity of this disciplinary effect depends on the type and accuracy of the information shared among

lenders. Thus, if there is a decrease on the amount of negative information shared, the disciplinary role will be less pronounced. Also, by decreasing the informational monopoly that banks have about their borrowers, information sharing also decrease the fear of borrowers of being exploited via higher interest rates in the future, and thus increase the borrowers' effort, as shown by Padilla and Pagano (1997).

In the second part of our analysis, we examine if firms strategically switch banks after a delinquency period or if they are more likely to be financed again by their existing bank relationships. In particular, we are interested in analyze whether the ability of a firm with previous negative records to obtain a new loan from an *outside*/*inside* bank is affected by the introduction of the Habeas Data Law. Our results suggest that firms with previous negative records are less likely to get new loans from both *inside* and *outside* banks in the *New Regime*. However, the median time to get a new loan from an *outside* bank increases significantly more than the median time to get a new loan from an *inside bank* (from four to nine quarters and from one to two quarters, respectively). This also shows that after a delinquency period, *inside banks* seem to be the first providers of bank loans in both regimes.

In addition, we find that during the *New Regime* both *inside* and *outside* banks grant loans with looser loan terms but higher collateral requirements to firms with previous negative records. However, the reduction in the interest rate and the increase in the maturity seem to be more pronounced for *outside banks*. This might be explained in part by the fact that, as mentioned before, the mean time to grant a new loan increased relatively more for *outside banks* than for *inside banks*. Therefore, by the time *inside banks* grant a new loan the delinquency period is relatively fresh or otherwise, still present in their own records. While by the time *outside banks* grant a new loan, the delinquency period is already distant and more likely no longer observable for them. Thus, firms seem to wait long enough, until their bad records are removed, before switching banks and enjoying its initial benefits (Ioannidou and Ongena (2010), Farinha and Santos (2002)).

In the third part of our analysis, we analyze whether banks modified their lending strategies after the introduction of the Habeas Data Law. Notice that this exercise is different from the one mentioned in the previous paragraph, as now we use the sample of all loans at origination instead of a reduced sample of firms with previous negative

records. We find that banks grant loans with higher interest rates (+0.4bp to 1.7pp), consistent with previous empirical evidence that find that an increase (reduction) of information sharing is associating with lower (higher) cost of credit. (Brown, Jappelli and Pagano (2008)). In addition we find that banks are less likely to include collateral in the loan contracts (-2.4pp to -5.6pp). This suggests that banks use collateral as a mechanism to mitigate moral hazard problems. Given that in the *New Regime* there are less observably riskier borrowers, the likelihood to pledge collateral decreases. Finally, we find that firms with clean repayment history (*Good Firms*) get loans with lower interest rates (13bp) and are more likely to pledge collateral in the *New Regime*. This result goes in line with the theories that explain collateral as an attempt to compensate for ex-ante asymmetric information (Bester, 1985, 1987; Besanko and Thakor, 1987; Chan and Thakor, 1987; Boot, Thakor, and Udell, 1991). In other words, collateral is use by *Good Firms* as a mechanism to signal their quality when the level of asymmetric information in the credit market increases. As in Berger, Frame, Ioannidou (2011), we find empirical evidence of both ex ante and ex post theories of collateral, however the ex-post theories are empirically predominant.

The paper unfolds as follows. Section II presents the Colombian Background, Section III describes the law change. Section IV describes the dataset and provides summary statistics. Section V presents the methodology. Section VI presents the empirical analysis. Section VII concludes.

II. COLOMBIAN BACKGROUND

In the early nineties Colombia undertook a process of financial liberalization[2] and almost simultaneously, there was a significant increase in capital inflows. During that period, the Colombian domestic investment grew much more than in any other Latin American country. There was an increase in the demand for non-tradable goods, particularly on real estate. This leaded to an increase in domestic credit and in asset prices, as well as a real appreciation of the Colombian peso. By then, most of the

2 The financial liberalization process aimed at enhancing competition, allowing the operation of foreign banks in the country, increasing the reliance on market instruments, and reducing government and monetary authorities' intervention in the financial system. Interest rates for savings deposits, for mortgage loans and for a large part of other loans were liberalized, and the Central Bank's capacity to intervene interest rates was limited (Arbeláez and Echavarría, 2002).

loans of the banking system were concentrated on maturities of one year or less. The long term financing was limited to mortgage lenders, which adopted mortgage schemes with riskier amortization requirements. Which combined with a lack of proper evaluation of mortgage loans increased the credit risk of these institutions. In addition, the capital requirements of mortgage lenders were lower than those of other intermediaries (Uribe (2008)).

Between 1997 and 1999 there was a reversal of capital flows that affected the financial system through the reduction in liquidity and a subsequent increase in the funding costs. The reversal of capital flows was accompanied with deterioration on the terms of trade. This led to a sharp decline in aggregate spending. The product fell more than 4% in 1999 and real estate prices were down about 27% in real terms (Uribe (2008)).

The increase in real interest rates together with a fall in real estate prices increased the financial burden on households. As a result, there was an increase in non-performing loans[3] that affected the solvency ratios of financial intermediaries. Several mortgage institutions remained weak for a long period of time and few others suffered bankruptcy. The general increase in the perception of credit risk led financial intermediaries to shift their portfolio composition towards government securities (Uribe (2008)). The crisis evidenced many of the limitations of the financial sector's risk management. As a result, Colombia made significant improvements in assessing credit risks and market liquidity in the spirit of Basel II.

Currently, Colombia is Latin America´s fourth largest economy and since the early 2000´s has been converging fast towards higher living standards. Thanks to the adoption of sound macroeconomic policy reforms Colombia has have underpinned growth and reduced macroeconomic volatility. Among the main macroeconomic reforms adopted stand up, the adoption of a full-fledged inflation-targeting regime in 1999[4] (with an inflation target range of 2.0-4.0%), a flexible exchange rate, a structural fiscal rule and solid financial regulation. Since 2002 the country experienced economic growth as well as low inflation and low interest rates (see

3 Non- performing loans over total loans reached 12% in 1999 (Arbeláez and Echavarría, 2002).
4 Between 1992 and 1999 monetary policy was conducted on the basis of an intermediate monetary target and a crawling band for the exchange rate (Gómez, Uribe and Vargas (2002)).

Graph 1), as most of the countries in Latin America. This climate translated in confidence that stimulated investment, especially foreign direct investment (OECD, 2015).

[Graph 1 around here]

The Colombian economy was not dramatically affected by the global financial crisis. There was no GDP contraction but an economic slowdown that was quickly reverted. The GDP grew 6.9% in 2007 and 3.5% in 2008. There was a slow down in 2009, when the economy grew at 1.7%, however, there was a rapid recovery in 2010 when the GDP grew 4.0% and was followed by a growth of 6.6% in 2011 (see Graph 2). The slowdown experienced by the Colombian economy was less pronounced than the one observed in the rest of Latin America; and there is general consensus that the crisis encounters the region better prepared than in the past. The response capacity of the countries was quite different from what was observed in the debt crisis of the eighties (Kacef and Jiménez (2009)).

[Graph 2 around here]

Due to the privatization of public assets, which brought additional revenue, the Colombian government's income was not affected during the crisis (UNFPA, 2011). In addition, the negative effects of the global financial crisis were mitigated by a variety of countercyclical monetary and fiscal policy measures[5]. As a result, the banking system withstood the financial turbulence with capital and liquidity ratios well above regulatory requirements (World Bank, 2013).

III. DESCRIPTION OF THE LAW CHANGE

Before 2008, institutions in Colombia were able to access a borrower's entire credit history through the credit bureaus. Both positive and negative credit information was available through different portals (i.e., Datacredito, CIFIN). Positive information

[5] These measures relied partly on funding from multinationals, such as the International Monetary Fund, the World Bank and the Inter-American Development Bank.

comprises information on both outstanding and previous loans, including: loan amount, maturity, value of collateral, bank granting the loan and the evolution over time of the loan, among others. Negative information corresponds to the information on payment defaults. In order to access the information for the first time, banks require authorization by the loan applicant. If a loan is originated and as soon as there is an outstanding credit relationship between the bank and the firm, the bank retains the right to access the information for monitoring purposes.

The severe reduction in the supply of credit that followed the economic crisis of the 90's raised the need to create a law that limit the access to negative credit information. Several legislative projects were launch since the late nineties, however all of them failed to reach the approval by the Senate, the House of Representatives or the Constitutional Court. It was only until October 16th of 2008 that the Constitutional Court approved the legislative project, and finally become a law after the approval of the President in December 31st of 2008. The Habeas Data law (No. 1266) aims to develop the fundamental right of all people to acknowledge, update and rectify information gathered about them in databases. It also aims to develop all other rights, freedoms and constitutional guarantees related to the collection, the processing and the circulation of personal data as referred in the Article 15 of the Colombian Constitution. The law makes particular emphasis on the information of financial, credit, business, and services nature; and also on the information coming from other countries.

The law applies to all the personal information registered in databases administered by public or private institutions. It applies without prejudice to special rules that provide the confidentiality or reserve of certain information recorded in public datasets, for statistical purposes, research or sanction of crimes, or to ensure public order.

In the context of credit markets, the Habeas Data regulates the management and circulation of all the information collected about borrowers (i.e., consumers, firms) by different institutions, including the credit bureaus. And, in particular, it protects the right of borrowers to be forgiven and forgotten by restricting the access to the negative credit information. After the introduction of the Habeas Data law, the negative information of a loan is observable only for a period that

depends on the length of the delinquency period. If the loan is delinquent for less than two years, then it remains in the portals for a period equal to twice the duration of the delinquency period, i.e. if the loan is delinquent for 2 months, the information will be in the portals for 4 months. On the other hand, if the loan is delinquent for more than two years, it remains in the portals for a fix period of 4 years, i.e. if the loan is delinquent for 3 years, the information will be in the portals for 4 years. The relationship between the retention time and the delinquency period of the Habeas Data law is represented in Graph 3. Finally, borrowers that never repay their loans stay in the portals for 10 years. The positive information on performing loans, however, remains available for the whole credit history.

[Graph 3 around here]

The law included a transition period of six months. During that period, borrowers were incentivized to repay their loans in order to clean their credit history. The borrowers that repay their loans before the end of the transition period were in the portals for one year. The borrowers that after repaying their loans had been on the portals for a year or more by the end of the transition period were removed immediately. The rule of the transition period is presented in detail in Table 1. Graph 4 presents the time line of the legislative project since the Constitutional Court approved it, and thus the public was certain the law was going to be ratified in the near future, until the actual implementation of the law.

[Table 1 around here]

[Graph 4 around here]

IV. DATA AND DESCRIPTIVE STATISTICS

Financial Institutions in Colombia are required by law to report detailed information on their loans to the *Superintendencia Financiera de Colombia* (SFC), the regulator of Colombian's financial system. The information is confidential and is used for policy and research purposes. Unlike the credit bureaus, the credit register contain the complete credit history of all the loans, which provides an essential ingredient to

disentangle the behavioral changes of borrowers and lenders after the introduction of the Habeas Data law.

For our analysis we use the credit register of commercial loans[6]. The dataset provides a detailed look at all the loans granted by the financial system to firms on a quarterly basis. Characteristics such as loan amount, collateral, maturity, rate, credit score and exact date of origination are included from 1998:12 to 2012:06. The Information on the credit register is merged with the Financial Statements of the Firms and also Financial Statements of the banks. Information about firm's financial statements is provided on a yearly basis by the Superintendencia de Sociedades, the government organ that regulates non-financial firms. Information on bank's financial statement is gathered from the website of the SFC. The final sample contains 1.3 million loan observations granted to 28,866 firms by 71 banks.

Table 2 presents summary statistics of firms' characteristics for the total sample. The mean *Return on Equity (ROE)* is 5.8 percent, the mean *Current Ratio (CR)* is equal to 256.9 percent, which means that the current assess cover more than twice the current liabilities. The mean *Capital Structure ratio*, defined as liabilities over equity, is equal to 205.5 percent and about 40 percent of the firms are small in terms of assess size. Table 3 presents difference in means of Firm Characteristics between firms in the *Old Regime* and firms in the *New Regime*. Firms seem to be in better financial conditions during the *New Regime*. They have higher returns (ROE), higher liquidity ratio (CR), lower leverage ratios and bigger in terms of access size.

[Table 2 around here]

[Table 3 around here]

Table 4 presents summary statistics of loan characteristics. The mean interest rate is equal to 16,6 percent, 40 percent of the loans have collateral, the mean loan amount is 678.2 million COP, which is equivalent to 376 thousand dollars, and the maturity is equal to 33 months (almost three years). Table 5 presents difference in means of loan characteristics between the *Old Regime* and the *New Regime*. The mean loan terms seem to be looser in the *New Regime* compared to the *Old Regime*. The interest rate is

[6] The dataset was provided to us due to a direct link of one of the authors with the Central Bank of Colombia.

3.3% percentage points lower, the loan amount is 103.8 million COP higher and the maturity is 9 months longer. However, the likelihood to be required to pledge collateral is higher by 10 percentage points.

[Table 4 around here]

[Table 5 around here]

V. METHODOLOGY

Several of the research questions addressed in this study are examined using a duration analysis. These models, in contrast to other methods, treat the time to the occurrence of an event as the outcome variable and deal well with censoring observations. The specific definition of the outcome variables (duration) will follow in each of the subsections of the empirical analysis (Section V).

In what follows we present the generalities of the duration models following Kiefer (1988). Let T represent the duration of time that passes before the occurrence of a certain random event. Duration can be represented by its density function $\mathrm{f(t)}$ or its cumulative distribution function $\mathrm{F(t)}$, where $\mathrm{F(t) = P(T \leq t)}$, for a given t. The survival function, which is an alternative way of representing duration, is given by $\mathrm{S(t) = 1 - F(t) = P(T > t)}$. In other words, the survival function represents the probability that the duration of an event is larger than a given t. A particular useful function for duration analysis is the hazard function $\lambda(t) = f(t)/S(t)$. $\lambda(t)$ is the rate at which spells will be completed a duration t, given that they last until t. The hazard function provides a convenient definition of duration dependence. When $\lambda(\mathrm{t})$ is increasing in t, there is a positive duration dependence, which means that the probability that a spell will end increases as the spell increases in length. Similarly, when $\lambda(\mathrm{t})$ is decreasing in t, there is a negative duration dependence, which means that the probability of ending the spell decreases as the spell lengthens.

We begin by deploying the unconditional Kaplan-Meier (1958) estimator of the survivor function $\mathrm{S(t)}$ which takes censored data into account. The estimator is given by $\hat{\mathrm{S}}(\mathrm{k}) = \prod_{\mathrm{i}=0}^{1}\left(1 - \hat{\lambda}(\mathrm{i})\right)$, where $\hat{\mathrm{S}}(\mathrm{k})$ is the estimated probability that the spells

survives beyond time k. With a correction for right censoring, $\hat{\lambda}(i)$ is the number of losses in time i, divided by the number of survivals.

When estimating hazard functions, it is convenient to assume a proportional hazard specification, such that

$$\lambda(t, X(t), \beta) = \lambda_0(t)\Phi(\beta' X_t)$$

where $\lambda_0(t)$ denotes the baseline hazard function, common to all observations, which captures the direct effect of time on the transition intensity. For estimation purposes, no functional form is specified for the baseline hazard. X_t is a set of observable time-varying explanatory variables and β is a vector of unknown parameters to be estimated. An exponential form is chosen for $\Phi(.)$, which has the advantage of guaranteeing non-negativity without imposing any restrictions on the values of the vector of parameters β. The model is estimated using the Cox (1972) partial likelihood model, Weibull specification and exponential specification.

VI. EMPIRICAL ANALYSIS

1. Performance of loans after the Habeas Data law

We begin by analyzing whether firms are more prone to stop making payments on their loans after the Habeas Data law. We first analyze the time it takes for a new loan to default on its payments. We then analyze the time it takes for a delinquent loan to be repaid. Given that the behavior of borrowers and lenders could have being altered during the transition period, we exclude it from the analysis and leaving it for future research. Graph 5 illustrates how the spells are distributed across time. For comparison purposes between the *Old Regime* and the *New Regime*, we include in our analysis the spells that start and end in the *Old Regime* and the spells that start and end in the *New Regime* (spells "1-1" and "3-3" in the Graph). Moreover, we exclude the spells that started prior to 2002, because some of them would suffer from left censoring; and also, because some of the variables used in the analysis such as *Length of Relationship* and *Previous Delinquent Loans* are censored at the beginning of the sample.

[Graph 5 around here]

Loan delinquency

Duration T is defined as the number of consecutive quarters before a loan starts having payment default. The origin of the survival time is taken as the quarter of origination of the loan. Survival can be observed only partially, because the observation period terminates at some point in time (in 2012), after which payment defaults cannot be observed. Some loans exit the observation period without experiencing any delay in their payments; they may or may not experience payment defaults in the future.

Graph 6 shows the unconditional survival function $S(t)$, estimated separately for loans granted during the *Old Regime* and loans granted during the *New Regime* (spells "1-1" and "3-3" in Graph 5) using the Kaplan-Meier estimator. The shadows around the survival functions represent 95% confidence intervals. A log-rank test for equality of survivor functions suggest that loans in the *New Regime* are less likely to survive, or in other words, they are more likely to stop making payments, as borne out by a p-value of 0.0.

[Graph 6 around here]

We then turn to estimate a semi-parametric Cox (1972) regression model, taking into account the impact of firm, relationship, bank and loan characteristics on the conditional probability of a payment default. The sign on the coefficients β can be interpreted as the partial impact of a time varying covariant on the probability of defaulting on the payments of a loan, holding duration constant. The results for fourth different models are presented in Table 6. The first model includes only an indicator variable for the *New Regime,* it takes the value of one if the loan was granted after the introduction of the Habeas Data Law and zero otherwise (Column I). The second model adds firm and relationship characteristics (Column II). The third model adds loan and macroeconomic characteristics (Column III). The fourth model includes bank fixed effects (Column IV).

[Table 6 around here]

The results for the first model (Column I) suggest that loans in the *New Regime* are more likely to default on their payments, consistent with the results of the unconditional estimation made with the non-parametric Kaplan-Meier estimator.

Nonetheless, when we include firm, relationship, loan and macroeconomic characteristics (Columns II, III and IV) the sign of the coefficient changes to negative.. The results also show that a loan is more likely to default when the firm has lower ROA, higher current ratio, higher leverage, when it is small, when it has a shorter relationship with the bank and when it has been delinquent on previous loans. Moreover, a loan is more likely to default if it is small, collateralized, has a high interest rate and a shorter time to maturity.

We then proceed to analyze the characteristics of the firms and the loans at the exact time of default. Table 7 presents the difference in means of the variables at the Default Point between the *Old Regime* and the *New Regime*. The defaulting firms of the *New Regime* seem to be in better financial conditions than the defaulting firms of the *Old Regime*. They have significantly higher ROA and higher current ratio. They also have a lower leverage ratio, however the difference is not statistically significant. Moreover, after the introduction of the Habeas Data law, the loan terms of the loans in default have lower interest rates (-3.3 percentage points) and higher collateral requirements. The fact that firms have better financial indicators at the Default Point in the *New Regime*, might suggest that the reduction in the retention time, introduced by the Habeas Data Law, disincentives firms to make their loan payments.

[Table 7 around here]

Repayment of Delinquent Loans

We perform a similar analysis for the repayment of delinquent loans. Duration T is defined as the number of consecutive quarters before a delinquent loan is repaid. The origin of the survival time is taken as the quarter in which the loan becomes delinquent. Also, in this case, survival can be observed only partially, because the observation period terminates in 2012 and after that loan repayments cannot be observed. Graph 7 shows the unconditional survival function $S(t)$, estimated separately for delinquent loans during the *Old Regime* and delinquent loans during the *New Regime* (spells "1-1" and "3-3" in Graph 5). The shadows around the survival functions represent 95% confidence intervals. A log-rank test rejects the null hypothesis of equality of survivor functions (as borne out by a p-value of 0.0). This

suggests that delinquent loans in the *New Regime* are less likely to be repaid, or in other words, the duration of the spells of payment default is longer.

[Graph 7 around here]

We then turn to estimate the semi-parametric Cox (1972) regression model, taking into account the impact of firm, relationship, bank and loan characteristics on the conditional probability to repay a delinquent loan. The results for fourth different models are presented in Table 8. The first model includes only the indicator variable for the *New Regime* (Column I). The second model adds firm and relationship characteristics as well as industry fixed effects (Column II). The third model adds loan and macroeconomic characteristics (Column III) and the fourth model includes bank fixed effects (Column IV). The results suggest that delinquent loans in the *New Regime* are less likely to be repay than delinquent loans in the *Old Regime*, consistent with the results of the unconditional estimation made with the non-parametric Kaplan-Meier estimator. These results are also robust to the inclusion of Bank FE. In addition, in unreported results we estimate the models using the exponential and the Weibull specifications of the baseline hazard function. The coefficient estimates are in line with those presented in Table 8, indicating that they are not sensitive to the specification of the baseline hazard function. The results also show that a delinquent loan is more likely to be repaid when the firm has higher ROA, lower current ratio and lower leverage. Moreover, a delinquent loan is more likely to be repaid if it is collateralized, small and has a low interest rate.

[Table 8 around here]

We then proceed to analyze the characteristics of the firms and the loans at the exact time of repayment. Table 9 presents the difference in means of the variables at the Repayment Point between the *Old Regime* and the *New Regime*. The firms that repay their loans in the *New Regime* seem to be in better financial conditions than the firms that repay their loans in the the *Old Regime*. They have significantly higher ROA and higher current ratio. They also have a lower leverage ratio, although the difference is not statistically significant. Moreover, after the introduction of the Habeas Data law, the set of delinquent loans that are repaid have lower loan amounts, lower interest rates, longer time to maturity and are more likely to have collateral. In general, even

though firms seem to be in better financial conditions in the *New Regime*, they take more time to repay their delinquent loans.

[Table 9 around here]

2. New loans from Outside/Inside Banks after loan repayment

In the second part of our study, we analyze the time it takes for a firm, with previous records of non-performing loans, to get a new, and how it is affected by the introduction of the Habeas Data Law. We divide the analysis in two parts: new loans from banks with which the firm did not have a lending relationship in the past (*outside banks)* and new loans from banks with which the firm had a lending relationship before (*inside banks)*. We do so in order to determine what is the first source of bank debt of a firm after a delinquency period. In other words, we examine if firms strategically switch banks after a delinquency period or if they are more likely to be financed again by their existing bank relationships. In particular, we are interested in analyze whether the ability of a firm to obtain a new loan from an *outside*/*inside* bank is affected by the introduction of the Habeas Data Law. Unlike *outside banks*, *inside banks* are able to gather private information about the firm during the course of the relationship. The increase in information asymmetries provided by the introduction of the Habeas Data Law, might have enabled *inside banks* to gather a greater amount of private information. Thus, borrowers might change their strategies accordingly.

We start by isolating a sample of firms that face only one payment default during the sample period and then estimate the time it takes for them to get a new loan after repayment. We use the firms that experience only one payment default in order to avoid overlapping between the time to get a new loan and the start of a new arrear. In our sample 4,287 firms have only one payment default during the sample period and 3,453 firms had more than one. We analyze if the time to get a new loan from an *outside*/*inside* bank differs between the *Old Regime* and the *New Regime*.

Duration T is defined as the number of consecutive quarters before a firm gets a new loan from an *outside*/*inside* bank. The origin of the survival time is taken as the

quarter in which the firm pays its delinquent loan. Survival can be observed only partially, because the observation period terminates at some point in time (in 2012), after which new loans cannot be observed. Some firms exit the observation period without getting a new loan from an *inside*/*outside* bank and they may or may not get a new loan in the future. Given that we aim to analyze how the likelihood to get a new loan from an *inside*/*outside* bank was modified by the introduction of the Habeas Data law irrespective of the transition period, we also exclude this period from this part of the analysis.

Graph 8 presents two panels with unconditional survival functions. Panel A shows the probability that the time to get a new loan from an *outside bank* is later than some specified time t. Panel B shows the probability that the time to get a new loan from an *inside bank* is later than some specified time t. The survival functions are estimated separately for the firms that repay their loans during the *Old Regime* and the firms that repay their loans during the *New Regime* (spells "1-1" and "3-3" in Graph 5). Log-rank tests for equality of survivor functions suggest that, after a delinquency period, firms in the *New Regime* are less likely to get new loans from both *inside* and *outside* banks, than firms in the *Old Regime*. The median time to get a new loan from an *outside* bank is four quarters in the *Old Regime* and nine quarters in the *New Regime*. Moreover, the mean time to get a new loans from an *inside* bank is one quarter in the *Old Regime* and two quarters in the *New Regime*. This suggests that *inside banks* are the first providers of bank loans for firms with previous records of non-performing loans in both regimes.

[Graph 8 around here]

We then turn to estimate semi-parametric Cox (1972) regression models, taking into account the impact of firm characteristics on the conditional probability that a firm with previous non-performing loan records gets a new loan. The regressions are performed separately for the likelihood that a firm gets a new loan from an *outside bank* and the likelihood that a firm gets a new loan from an *inside bank*. The results for two different models are presented in Table 10. The first model includes only an indicator variable for the *New Regime* (Column I). The second model adds firm characteristics including the variable *Length of Loan Delinquency* that measures the length of the delinquency period of the firm, it also includes macroeconomic

characteristics and industry fixed effects (Column II). In Column (III) the second model is estimated using a Weibull specification for the baseline hazard. The coefficients measure the partial impact of each variable on the likelihood a firm gets a new loan from an *Outside*/*Inside bank*, conditional on duration. The negative and statistically significant coefficients reported for the *New Regime* dummy suggest that after a delinquency period, firms are least likely to get new loans from both *inside* and *outside* banks in the *New Regime* than in the *Old Regime*. These results are robust to the three specifications and are consistent with the results of the unconditional estimation made with the non-parametric Kaplan-Meier estimator. We also find that the likelihood to get a new loan decreases with the *Length of Loan Delinquency*, however we do not find a differential effect between the *Old Regime* and the *New Regime* (unreported results). We also estimate the models using an exponential specification for the baseline hazard. The magnitude and significance of the coefficients are similar to the ones reported in Table 10. This suggests that our results are not sensitive to the specification of the baseline hazard. The parameter ρ of the Weibull specification ($\lambda_0(t) = \rho\lambda t^{\rho-1}$) is statistically greater than one, which suggests that as the time after the delinquency period of the firm lengthens, the likelihood to get a new loan increases.

[Table 10 around here]

Table 11 compares the loan conditions of the first new loans granted by *inside*/*outside* banks to firms after a non-performing period, before and after the introduction of the Habeas Data Law. Both *inside* and *outside* banks seem to increase the collateral requirements, reduce the interest rate and increase the maturity after the introduction of the law. However, the reduction in the interest rate and the increase in the maturity seem to be more pronounced for the *outside banks*. This might be explained by the fact that, as mentioned before, the mean time to grant a new loan to a firm with non-performing records increased relatively more for *outside banks* than for *inside banks* after the introduction of the law. Therefore, by the time *inside banks* grant a new loan the delinquency period is relatively fresh or otherwise, still present in their own records. While by the time *outside banks* grant a new loan, the delinquency period is already distant and more likely no longer observable for them.

[Table 11 around here]

We estimate the following model for each of the loan conditions using the sample of 1,101 (2,403) new loans granted to firms with non-performing records by *outside (inside) banks*,

$$Loan\ condition_{ijt} = \gamma\ New\ Regime_t + \beta\ Firm_{it} + \alpha\ Loan_{ijt} + \theta_j + \varepsilon_{ijt}$$

where i, j and t index firm, bank and time (in quarters) respectively. θ_j corresponds to bank fixed effects. They capture any systematic differences across banks. The results are reported in Tables 12 (*outside banks*) and 13 (*inside banks*).

Consistent with the comparison in means of loan characteristics presented in Table 11, we find that after the introduction of the Habeas Data Law both *inside* and *outside* banks grant loans with looser loan terms but higher collateral requirements to firms with previous records of non-performing loans. In particular, we find that loans granted by *outside banks* after the introduction of the law have: interest rates that are lower by 4.3 percentage points (pp), are 6pp more likely to be required to pledge collateral and have maturities that are 4.3 months longer (Table 12). Moreover, loans granted by *inside banks* during the *New Regime* have: interest rates that are 3.5pp lower, are 3pp more likely to be required to pledge collateral and have maturities that are 2 months longer.

[Table 12 around here]

[Table 13 around here]

3. Banks' Lending Strategies

We now turn to analyze whether banks modified their lending strategies after the introduction of the Habeas Data Law. We start by analyzing if the loan terms of loans at origination changed after the introduction of the Habeas data law. We also test whether good firms (as defined below) get the same treatment after the *New Regime*. In order to do so, we use the following model for each of the loan conditions:

$$\begin{aligned} Loan\ condition_{ijt} &= \gamma\ New\ Regime_t + \delta\ New\ Regime_t x\ Good\ Firm_{it} + \beta\ \ Firm_{it} \\ &+ \alpha\ Loan_{ijt} + \tau\ Macroeconomic_t + \theta_i + \theta_j + \varepsilon_{ijt} \end{aligned}$$

where i, j and t index firm, bank and time (in quarters) respectively. θ_i and θ_j corresponds to firm and bank fixed effects. They capture any systematic differences

across firms and across banks. $Good\ Firm_{it}$ is an indicator variable that takes the value of one if the firm never default before time t and zero otherwise. Our main coefficients of interest are γ and δ, which measure respectively the general effect of the *New Regime* over the new loans and the specific effect for firms with a clean repayment history. For our estimation we use the total sample of loans at origination, which is comprised by 450,984 loans granted to 26,400 firms.

The results, reported in Table 14, suggest that banks grant loans with higher spreads on interest rates (+4.0pb to 1.2pp), lower collateral requirements (likelihood to pledge collateral decreased by 2.4pp to 5.6pp), lower loan amounts (+1.2 to 1.3 million COP) and longer maturities (+0.4 to 1.7 months) in the *New Regime*. This is consistent with previous empirical evidence that find that an increase (reduction) of information sharing is associating with lower (higher) cost of credit (Brown, Jappelli and Pagano (2008)). Moreover the results for collateral suggest that banks use it to mitigate moral hazard problems. Given that in the new regime there are less observable observably riskier borrowers, the likelihood to pledge collateral decreases (Boot, Thakor, and Udell, 1991; Boot and Thakor, 1994; Aghion and Bolton, 1997; Holmstrom and Tirole, 1997). In addition, we find that a *Good Firm* gets loans with lower interest rates (-05bp to 13bp) and is more likely to pledge collateral in the *New Regime*. This result goes in line with the theories that explain collateral as an attempt to compensate for ex-ante asymmetric information (Bester, 1985, 1987; Besanko and Thakor, 1987; Chan and Thakor, 1987; Boot, Thakor, and Udell, 1991). In other words, collateral is use by *Good Firms* as a mechanism to signal their quality when the level of asymmetric information in the credit market increases. As in Berger, Frame, Ioannidou (2011), we find empirical evidence of both ex ante and ex post theories of collateral, however the ex-post theories are empirically predominant.

[Table 14 around here]

Finally, we analyze a sample of 167,247 new loans granted to 10,933 firms that received a loan from at least one *inside* and one *outside* bank in the same quarter. By doing this we are able to identify what are the differences in the loan conditions between *inside* and *outside* banks after the introduction of the Habeas Data Law. The following model is estimated for each of the loan conditions,

$$Loan\ condition_{ijt} = \beta\ Switch_{ijt} + \varphi\ Switch_{ijt} x New\ Regime_t + \alpha\ Loan_{ijt} + \theta_{it} + \theta_j + \varepsilon_{ijt}$$

where i, j and t index firm, bank and time (in quarters) respectively. θ_{it} corresponds to firm x time fixed effects and account for any observable and unobservable firm specific heterogeneity across time. θ_j corresponds to bank fixed effects and capture any systematic differences across banks. $Switch_{ijt}$ is an indicator variable that takes the value of one if the loan is granted by an *outside bank* and zero otherwise. Our main coefficient of interest is φ, which measure the effect of the *New Regime* on the new loans granted by *outside banks*. The results are reported in Table 15. We find that switching loans have lower spreads on interest rates (-31pb to -59pb), consistent with the findings in Ioannidou and Ongena (2010) using the Bolivian credit register. They are less likely to be required to pledge collateralized (-5.0pp to -4.1pp), they have lower loan amounts (-1.2 million COP) and shorter maturities (-6 months to -5.3 months). After the introduction of the Habeas Data Law, the spread on the interest rate of loans granted by *outside banks* seems to have an increase (+19bp to 35bp), however it continues to be lower compare to the interest rate of loans granted by *inside banks* (von Thadden (2004); Degryse and Van Cayseele). Moreover, the collateral requirements of *outside banks* seem to be even lower after the introduction of the law (-2.9bp to -2.6bp). In addition, the loan amount of loans granted by *outside banks* seems to have an increase after the introduction of the law (1.1 million COP), however, it continues to be lower than the loan amounts offered by *inside banks*. Finally, *outside banks* seem to grant loans with even shorter maturities after he introduction of the law (2.6 months). These results suggest that although there are less observably risky borrowers, there is a higher uncertainty about the quality of new borrowers for *outside banks*.

[Table 15 around here]

VII. CONCLUSION

In this paper we study the effect of a variation in the retention time of the firms' negative credit information. By exploiting a quasi-experimental variation in retention times caused by a law change in Colombia we are able to analyze the subsequent

bank-firm behavior. For our analysis we use a unique credit register of all the commercial loans granted in Colombia from 1998 to 2012. It allows us to access some private information about borrower risk that is unobserved by the lender, in particular the entire credit history of a firm (positive and negative information is included).

Consistent with the disciplinary role of information sharing among lenders (Jappelli and Pagano (1993), Padilla and Pagano (1997, 2000)), we find that a decrease in information sharing is associated with a longer duration of loan delinquency periods. We also find that firms, with previous records of non-performing loan, are less likely to get new loans from both *inside* and *outside* banks in the *New Regime*. Nonetheless, *inside banks* seem to be the first providers of bank loans for firms with previous records of non-performing loans in both regimes. Firms seem to strategically wait long enough, until their negative records disappear from the credit bureaus, before switching banks.

Consistent with this, we find that during the *New Regime* both *inside* and *outside* banks grant loans with looser loan terms but higher collateral requirements, to our sample of firms with previous records of non-performing loans. However, the reduction in the interest rate and the increase in the maturity seem to be more pronounced for the *outside banks*. Thus, by the time *inside banks* grant a new loan the delinquency period is relatively fresh or otherwise, still present in their own records. While by the time *outside banks* grant a new loan, the delinquency period is already distant and more likely no longer observable for them.

Finally, using a sample of loans at origination, we find that banks grant loans with higher interest rates in the *New Regime*, consistent with previous empirical evidence that find that an increase (reduction) of information sharing is associating with lower (higher) cost of credit (Brown, Jappelli and Pagano (2008)). In addition we find that banks are less likely to include collateral in the loan contracts, which suggests that banks use collateral as a mechanism to mitigate moral hazard problems. Compared to the *Old Regime*, in the *New Regime* there are less observably riskier borrowers, therefore the likelihood to include collateral in the loan contract decreases. Nonetheless, *Good Firms* seem to use collateral as mechanism to signal their quality in the *New Regime*. We therefore find empirical evidence of both ex ante and ex post theories of collateral.

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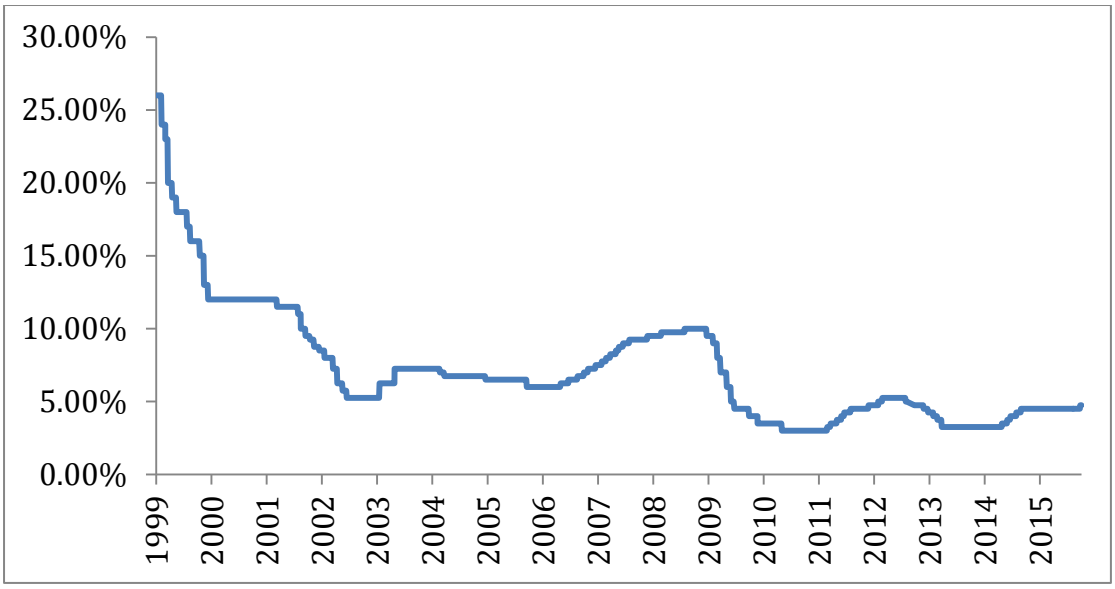
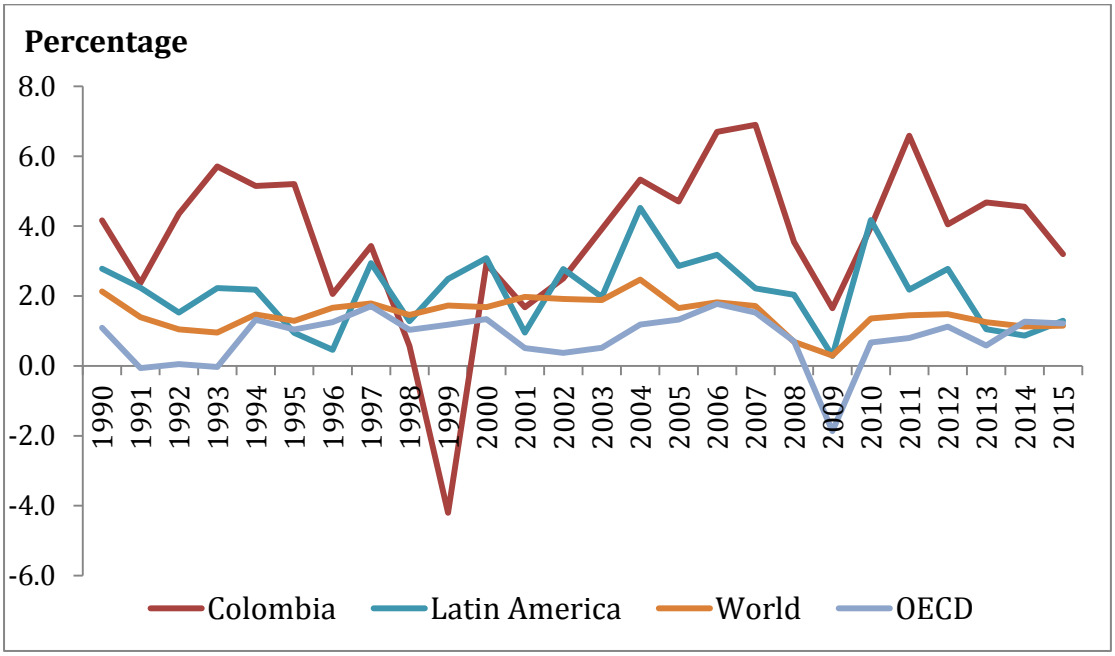
GRAPH 1
Interest Rate

The Graph shows the evolution of the Interest Rate (monetary policy rate) for Colombia.



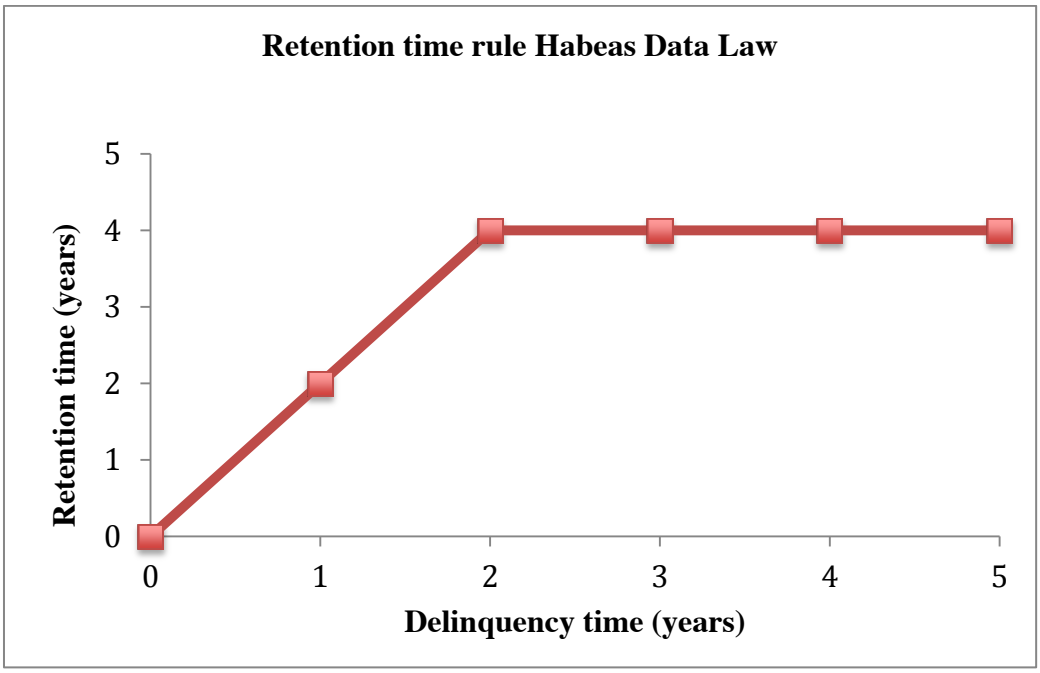
GRAPH 2
GDP Growth

The Graph shows the evolution of the GDP Growth for Colombia and for other regions of the world.



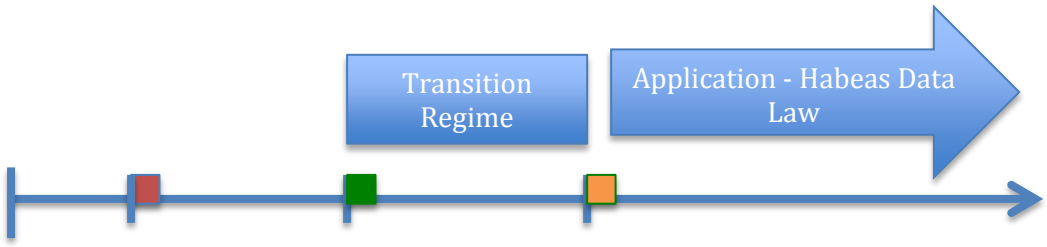
GRAPH 3
Retention Time Rule Habeas Data Law

The Graph shows the retention time as a function of the delinquency period according to the rule of the Habeas Data Law.



GRAPH 4
Time Line of the Legislative Project

The Graph presents the time line of the legislative project. The Constitutional Court approves the project for the first time in October 16th of 2008. The law is finally ratified on December 31st of 2008, when the President approves the legislative project. Between January and June of 2009 the transition regime take place and since July of 2009 the Habeas Data law is applied.



October 16th, 2008: The legislative project was declared constitutional.

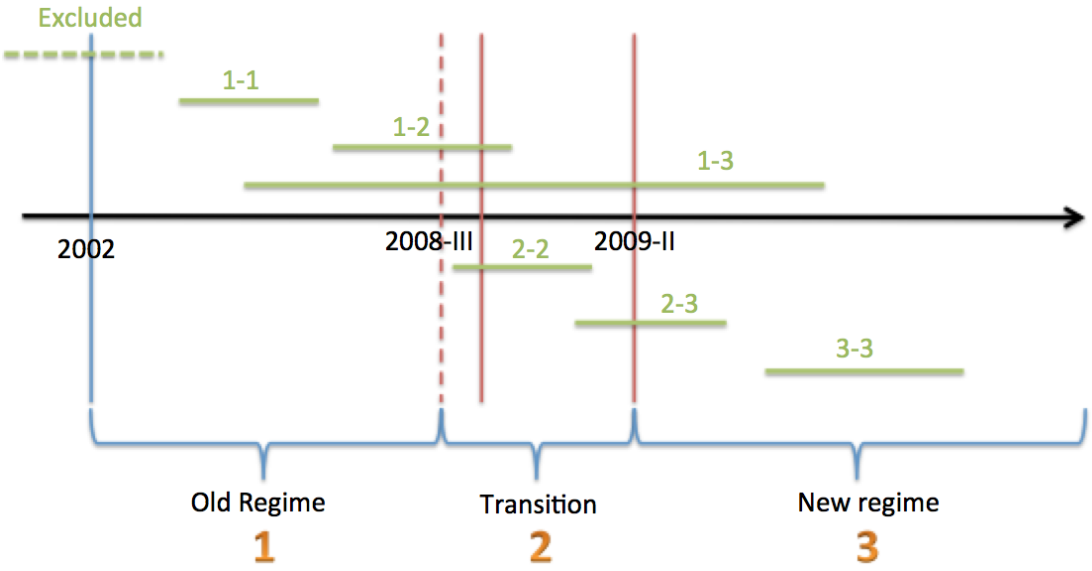
December 31st, 2008: The legislative project was approved by the President.

June 30th, 2009: Application of the Habeas Data Law.

GRAPH 5

Time Line: Spells Location

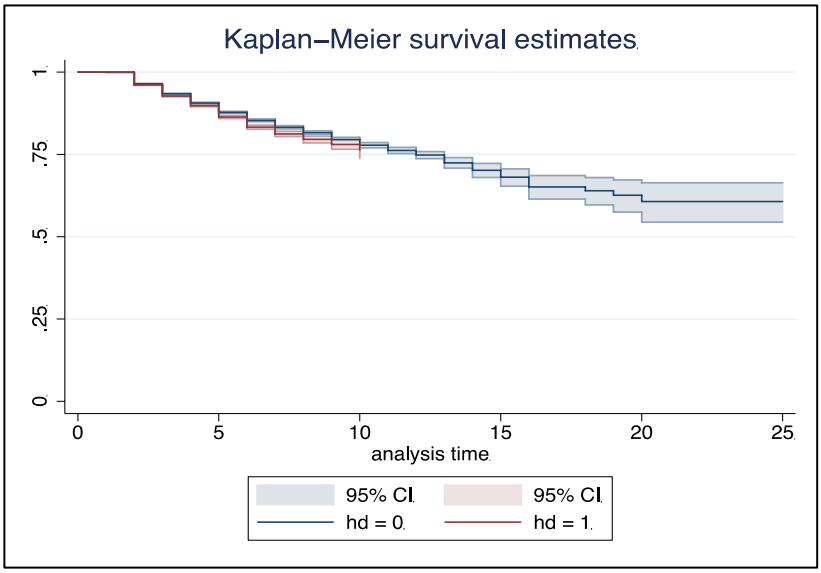
The Graph illustrates how the spells are distributed over time between the *Old Regime* (1), the *Transition Period* (2) and the *New Regime* (3). Spells "1-1" start and end during the *Old Regime*, spells "1-2" start in the *Old Regime* and end during the *Transition Period*, spells "1-3" start in the *Old Regime* and end in the *New Regime*, spells "2-2" start and end during the *Transition Period*, spells "2-3" start in the *Transition Period* and end in the *New Regime* and spells "3-3" start and end during the transition period. Spells that started prior to 2002 are excluded from the analysis.



GRAPH 6

Probability that a Loan do not Default Before Time t

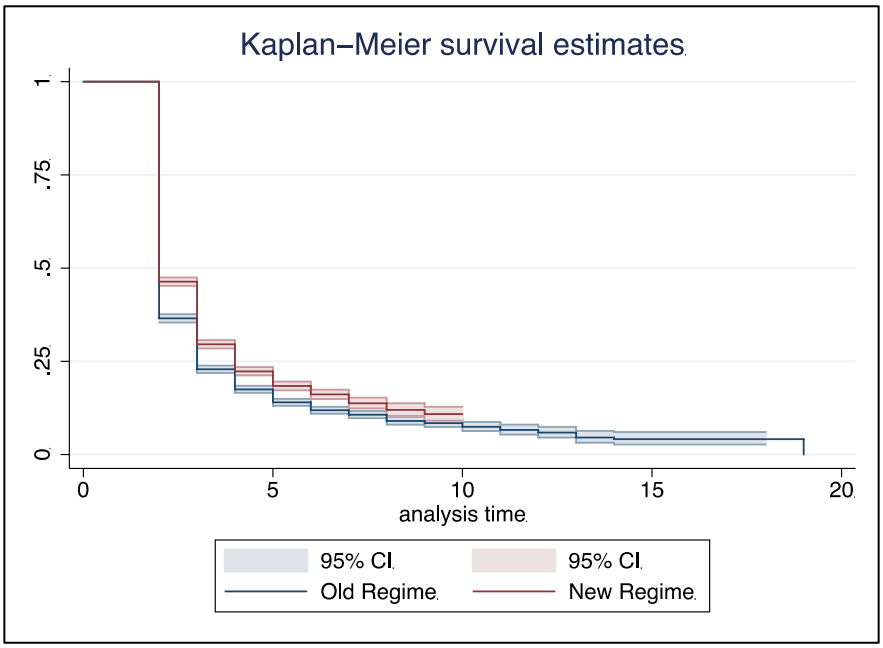
The Graph presents non-parametrically Kaplan-Meier survivor functions estimates with adjustment for right censoring. The 95% confidence intervals are also included. The survival function is estimated separately for loans granted during the *Old Regime* and loans granted during the *New Regime* (spells "1-1" and "3-3" in Graph 3). The figure is based on estimates of the survivor function $\hat{S}(k) = \prod_{i=0}^{1}(1 - \hat{\lambda}(i))$, where $\hat{\lambda}(i)$ is the sample estimator for the probability that a loan default, conditional on the loan being up to date until period i. The number of loan observations is 1.048.077, the number of loans is 648.387 and the number of failures is 13.663.



GRAPH 7

Probability that a Delinquent Loan is not Repaid Before Time t

The Graph presents non-parametrically Kaplan-Meier survivor functions estimates with adjustment for right censoring. The 95% confidence intervals are also included. The survival function is estimated separately for delinquent loans during the *Old Regime* and delinquent loans during the *New Regime* (spells "1-1" and "3-3" in Graph 3). The figure is based on estimates of the survivor function $\hat{S}(k) = \prod_{i=0}^{1}(1 - \hat{\lambda}(i))$, where $\hat{\lambda}(i)$ is the sample estimator for the probability that a delinquent loan is repaid, conditional on the loan being delinquent until period i. The number of loan observations is 40,910, the number of delinquent loans is 15,680 and the number of repayments is 11,709.

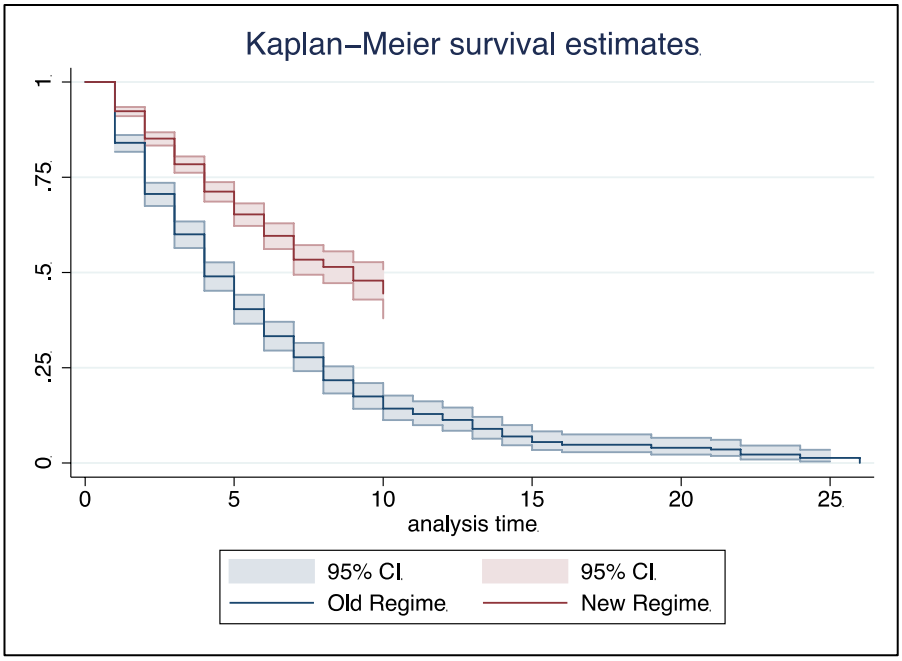


GRAPH 8

Probability that, After Repay its Delinquent Loan, a Firm Do Not Get a New Loan from an *Outside/Inside* Bank Before Time t

Panels A and B present non-parametrically Kaplan-Meier survivor functions estimates with adjustment for right censoring. The survival functions are estimated separately for firms that repay their delinquent loan during the *Old Regime* and firms that repay their delinquent loan during the *New Regime* (spells "1-1" and "3-3" in Graph 3). The figure is based on estimates of the survivor function $\hat{S}(k) = \prod_{i=0}^{1}(1 - \hat{\lambda}(i))$. In Panel A, $\hat{\lambda}(i)$ represents the sample estimator for the probability that a firm get a new loan from an *outside bank* (after repaying its delinquent loan), before period i. The number of firm observations is 9,834, the number of firms is 2,984 and the number of firms that get a new loan from an *outside bank* is 1,101. In Panel B, $\hat{\lambda}(i)$ represents the sample estimator for the probability that a firm get a new loan from an *inside bank* (after repaying its delinquent loan), before period i. The number of firm observations is 6,176, the number of firms is 3,386 and the number of switches is 2,403.

Panel A (failure): New Loan From an *Outside Bank*



Panel B (failure): New Loan From an *Inside Bank*

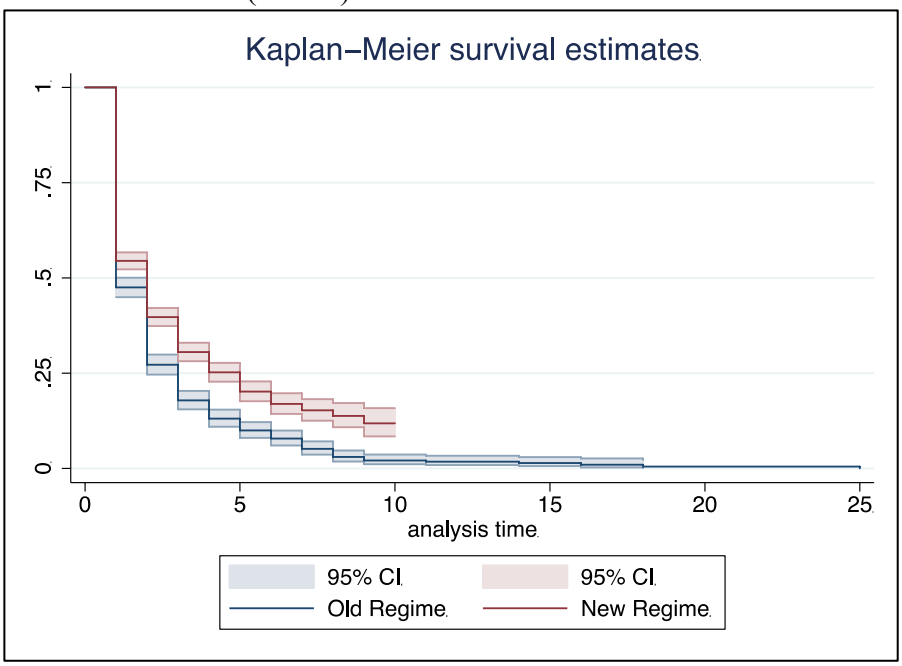


TABLE 1
Transition Rule of the Habeas Data Law

The table presents the rules of the transition period for borrowers that repay their delinquent loans before the introduction of the Habeas Data law and during the transition period. The date of exclusion of the negative information from the portals depends on the date of repayment of the loan and on the time in which the negative information has been already in the portals.

Repayment Date	**Negative information on the portals after repayment date**	**Transition rule**
Before December 31, 2008	>= 1 year	Immediate exclusion of the negative information.
Before December 31, 2008	< 1 year	The negative information is excluded one year after the repayment date.
Between December 31, 2008 and June 30, 2009	-	The negative information is excluded one year after the repayment date.

TABLE 2
Summary Statistics for Firm characteristics

The Table reports summary statistics of firm characteristics. The mean, median and standard deviation (SD) are presented for every variable. The number of firms in the sample equals 28,866. COP: Colombian Peso. In June 2011: 1,800 COP = 1 US Dollar or 1 Million COP = 555 US Dollars.

Firm Characteristic	**Definition**	**Mean**	**Median**	**SD**
ROE	Return on equity (%) = Net Income/Equity.	5.8	4.5	10.5
CR	Current ratio (%): current assets/current liabilities.	256.9	152.6	542.2
Capital Structure	Capital structure ratio (%) = Liabilities/Equity.	205.5	111.2	329.4
Assets	Total Assets (Million COP).	25,201.2	3,422.7	227,642.4
Small Firm	1 if the firm is small in terms of assets size, = 0 otherwise.	0.4	0.0	0.5

TABLE 3

Mean differences of firm characteristics between the old and the new regime.

The Table compares the means of Firm Characteristics between firms in the Old Regime and firms in the New Regime, using a t-test. The transition period is excluded. The number of firms equals 28,476. Note: *** Significant at 1%, ** significant at 5%, * significant at 10%.

	Old Regime	**New Regime**	**Mean Differences**	
ROE	5.6	6.0	0.4	***
CR	250.0	263.9	13.9	***
Capital Structure	209.2	198.4	-10.8	***
Assets	22,996.2	28,788.4	5,792.2	***
Small Firm	0.5	0.4	-0.1	***
Number of firms	21,195	21,458		

TABLE 4

Summary Statistics of Relationship and Loan Characteristics

The Table reports summary statistics of loan characteristics. The mean, median and standard deviation (SD) are presented for every variable. The number of loan observations in the sample equals 1,341,385. COP: Colombian Peso. In June 2011: 1,800 COP = 1 US Dollar or 1 Million COP = 555 US Dollars.

Variable	**Description**	**Unit**	**Mean**	**Median**	**SD**
Relationship Characteristics					
Length of Relationship	Length of the bank-firm relationship.	Quarters	10.3	8.0	8.7
Previous Delinquent Loans	= 1 if the firm delinquent on a loan in the past, = 0 otherwise.	0/1	0.3	0.0	0.5
Loan Characteristics					
Interest Rate	Interest rate on the loan.	%	16.6	15.7	7
Collateral	= 1 if loan is collateralized, = 0 otherwise.	0/1 %	38.0	0.0	49
Loan Amount	Loan size.	Million COP	678.2	97.5	2484.9
Ln Loan Amount	Natural logaritm of Loan size.	-	4.5	4.6	2.1
Maturity	Length of maturity	Months	33.4	24.0	41.1

TABLE 5

Mean Differences of Loan Characteristics Between the Old and the New Regime.

The Table compares the means of Loan Characteristics between the Old Regime and the New Regime, using a t-test. The transition period is excluded. The number of firms equals 1,211,279. Note: *** Significant at 1%, ** significant at 5%, * significant at 10%.

Loan Characteristic	Old Regime	New Regime	Mean Differences
Interest Rate	17.6	14.4	-3.3 ***
Collateral	0.3	0.4	0.1 ***
Loan Amount	638.0	741.9	103.8 ***
Ln Loan Amount	4.5	4.6	0.1 ***
Maturity	29.6	38.5	9.0 ***
Number of observations	741,409.0	469,870.0	

TABLE 6

Time to Default. Partial likelihood estimates of proportional hazard model

The Table presents estimates based on maximum likelihood estimation of the proportional hazard model using the Cox (1972) partial likelihood function. The coefficients measure the partial impact of each variable on the likelihood a loan defaults, conditional on duration. Definitions of the variables can be found in the Table 2 and Table 4. Column (I) report results of a model that includes only an indicator variable for the New Regime, it takes the value of one if the loan was granted after the introduction of the Habeas Data Law and zero otherwise. In Column (II) firm and relationship characteristics are included. In Column (III) loan and macroeconomic characteristics are added. Finally, Column (IV) includes bank fixed effects. The estimates in all the models are adjusted for right censoring. Coefficients are listed in the first row, robust standard errors that are corrected for clustering at the firm level are reported in the row below in parentheses, and the corresponding significance levels are in the adjacent column. Note: *** Significant at 1%, ** significant at 5%, * significant at 10%.

Models	I	II	III	IV
New Regime	0.10***	-0.14***	-0.12***	-0.14***
	(0.03)	(0.03)	(0.03)	(0.03)
Firm and Relationship Characteristics				
ROA		-0.02***	-0.02***	-0.02***
		(0.00)	(0.00)	(0.00)
Current Ratio		0.00***	0.00***	0.00***
		(0.00)	(0.00)	(0.00)
Liabilities/Equity		0.00***	0.00***	0.00***
		(0.00)	(0.00)	(0.00)
Small Firm		0.60***	0.48***	0.39***
		(0.03)	(0.03)	(0.03)
Length of relationship		-0.03***	-0.03***	-0.03***
		(0.00)	(0.00)	(0.00)
Previous Delinquent Loans		7.15***	7.16***	7.14***
		(0.20)	(0.20)	(0.20)
Loan Characteristics				
Collateral			0.12***	0.17***
			(0.02)	(0.02)
Ln(Loan Amount)			-0.05***	-0.05***
			(0.01)	(0.01)
Interest Rate			0.02***	0.02***
			(0.00)	(0.00)
Time to Maturity			-0.00***	-0.00***
			(0.00)	(0.00)
Macroeconomic Characteristics				
GDP Growth			-0.01***	-0.01***
			(0.00)	(0.00)
Industry Fixed Effects	NO	YES	YES	YES
Bank Fixed Effects	NO	NO	NO	YES
Log Likelihood	-154,377	-137,186	-136,983	-136,597
Number of Loans	648,387	648,387	648,387	648,387
Number of Failures	13,663	13,663	13,663	13,663
Number of Observations	1,051,720	1,051,720	1,051,720	1,051,720

TABLE 7

Mean differences of firm and loan characteristics at the Default Point, between the *Old Regime* and the *New Regime*

The Table compares the means of Firm and Loan Characteristics at the Default Point, between loans in the *Old Regime* and loans in the *New Regime*. The last Column presents a t-test for the differences in means. The number of loan observations is 13,487.
Note: *** Significant at 1%, ** significant at 5%, * significant at 10%.

	Old Regime	**New Regime**	**Mean Differences**	
Spell Length	3.3	2.9	-0.4	***
Firm Characteristics				
ROA	0.2	1.7	1.5	***
Current Ratio	183.0	226.8	44.0	***
Liabilities/Equity	275.3	268.7	-6.6	
Small Firm	0.4	0.4	0.0	
Length of relationship	8.7	12.0	3.3	***
Loan Characteristics				
Collateral	0.5	0.6	0.1	***
Ln(Loan Amount)	4.2	4.2	0.0	
Interest Rate	18.3	15.0	-3.3	***
Time to Maturity	19.9	20.4	0.5	
Number of Observations	7,755	5,732	13,487	

TABLE 8
Time to Repay a Delinquent Loan. Partial likelihood estimates of proportional hazard model

The Table presents estimates based on maximum likelihood estimation of the proportional hazard model using the Cox (1972) partial likelihood function. The coefficients measure the partial impact of each variable on the likelihood a delinquent loan is repaid, conditional on duration. Definitions of the variables can be found in the Table 2 and Table 4. Column (I) report results of a model that includes only an indicator variable for the New Regime, it takes the value of one if the loan was granted after the introduction of the Habeas Data Law and zero otherwise. In Column (II) firm and relationship characteristics are included as well as industry fixed effects. In Column (III) loan and macroeconomic characteristics are added. Finally, Column (IV) includes bank fixed effects. The estimates in all the models are adjusted for right censoring. Coefficients are listed in the first row, robust standard errors that are corrected for clustering at the firm level are reported in the row below in parentheses, and the corresponding significance levels are in the adjacent column. Note: *** Significant at 1%, ** significant at 5%, * significant at 10%.

Models	I	II	III	IV
New Regime	-0.13***	-0.16***	-0.24***	-0.25***
	(0.02)	(0.02)	(0.02)	(0.02)
Firm and Relationship Characteristics				
ROA		0.01***	0.01***	0.01***
		(0.00)	(0.00)	(0.00)
Current Ratio		-0.00***	-0.00***	-0.00***
		(0.00)	(0.00)	(0.00)
Liabilities/Equity		-0.00***	-0.00***	-0.00***
		(0.00)	(0.00)	(0.00)
Small Firm		0.01	-0.04**	-0.03*
		(0.02)	(0.02)	(0.02)
Length of relationship		-0.00	0.00	0.00
		(0.00)	(0.00)	(0.00)
Loan Characteristics				
Collateral			0.08***	0.05***
			(0.01)	(0.01)
Ln(Loan Amount)			-0.04***	-0.04***
			(0.00)	(0.00)
Interest Rate			-0.01***	-0.01***
			(0.00)	(0.00)
Time to Maturity			0.00	0.00
			(0.00)	
Macroeconomic Characteristics				
GDP Growth			-0.02***	-0.02***
			(0.00)	(0.00)
Industry Fixed Effects	NO	YES	YES	YES
Bank Fixed Effects	NO	NO	NO	YES
Log Likelihood	-106,693	-106,506	-106,469	-106,379
Number of Delinquent Loans	15895	15895	15895	15895
Number of Repayments	11551	11551	11551	11551
Number of Observations	40,380	40,380	40,380	40,380

TABLE 9

Mean differences of firm and loan characteristics at the Repayment Point, between the *Old Regime* and the *New Regime*

The Table compares the means of Firm and Loan Characteristics at the Default Point, between loans in the *Old Regime* and loans in the *New Regime*. The last Column presents a t-test for the differences in means. The number of loan observations equals the number of loans repaid during the sample period, which is 11,709. Note: *** Significant at 1%, ** significant at 5%, * significant at 10%.

	Old Regime	**New Regime**	**Mean Differences**	
Spell Length	2.4	2.4	0.0	
Firm Characteristics				
ROA	1.3	3.1	1.8	***
Current Ratio	179.3	216.7	39.1	***
Liabilities/Equity	247.1	240.0	-7.1	
Small Firm	0.4	0.4	0.0	
Length of relationship	9.9	12.7	2.8	***
Loan Characteristics				
Collateral	0.5	0.6	0.1	***
Ln(Loan Amount)	4.1	3.9	-0.2	***
Interest Rate	18.2	15	-3.2	***
Time to Maturity	16.4	18	1.7	**
Number of Observations	6,097	5,454	11,551	

TABLE 10
Time to Get a New Loan After the Repayment of a Delinquent Loan.
Partial Likelihood Estimates of Proportional Hazard Model

The Table presents estimates based on maximum likelihood estimation of the proportional hazard model using the Cox (1972) partial likelihood function. The coefficients measure the partial impact of each variable on the likelihood a firm gets a new loan from an *Outside*/*Inside* Bank, conditional on duration. *Length of Loan Delinquency* is the length of the period in which the firm was in default. Definitions of the rest of variables can be found in the Table 2. Columns (I) report results of a model that includes only an indicator variable for the *New Regime*, it takes the value of one if the loan was granted after the introduction of the Habeas Data Law and zero otherwise. In Columns (II) firm and macroeconomic characteristics, as well as industry fixed effects, are included. Columns (III) present estimates based on a Weibull Model. The estimates in all the models are adjusted for right censoring. Coefficients are listed in the first row, robust standard errors that are corrected for clustering at the firm level are reported in the row below in parentheses, and the corresponding significance levels are in the adjacent column. Note: *** Significant at 1%, ** significant at 5%, * significant at 10%.

Failure	New Loan From Outside			New Loan From Inside Bank		
Models	I	II	III (Weibull)	I	II	III (Weibull)
New Regime	-0.70***	-0.78***	-0.65***	-0.24***	-0.28***	-0.32***
	(0.06)	(0.06)	(0.07)	(0.03)	(0.03)	(0.06)
Firm Characteristics						
ROA		0.02***	0.01***		0.01***	0.00
		(0.00)	(0.00)		(0.00)	(0.00)
Current Ratio		-0.00*	-0.00*		-0.00***	-0.00***
		(0.00)	(0.00)		(0.00)	(0.00)
Liabilities/Equity		0.00**	0.00***		-0.00	0.00
		(0.00)	(0.00)		(0.00)	(0.00)
Small Firm		-0.41***	-0.34***		-0.26***	-0.31***
		(0.06)	(0.07)		(0.03)	(0.06)
Length of Loan Delinquency		-0.11***	-0.14***		-0.10***	-0.21***
		(0.03)	(0.04)		(0.02)	(0.04)
Macroeconomic Characteristics						
GDP Growth		0.00	-0.02		0.01	-0.03***
		(0.01)	(0.01)		(0.01)	(0.01)
Industry Fixed Effects	NO	YES	YES	YES	YES	YES
Log Likelihood	-7,701	-7,654	-	-18,015	-16,531	-
Number of Firms	2783	2783	2783	3355	3355	3355
Number of Outside/Inside new loans	1034	1034	1034	2375	2375	2375
Number of Observations	9120	9120	9120	6,139	6,139	6,139

TABLE 11

Mean Differences of the Characteristics of New Loans from *Outside*/*Inside* Banks (granted to firms with non performing records) Between the *Old Regime* and the *New Regime*

The Table presents the characteristics of New Loans from *Outside*/*Inside* banks, granted to firms after repaying their unique delinquent loan. The table compares the loans granted during the Old Regime versus the loans granted during the New Regime and presents a t-test for the differences in means. The number of loan observations equals the number of new loans from *Outside* banks: 1,101 and the number of loans from *Inside* banks: 2,403. Note: *** Significant at 1%, ** significant at 5%, * significant at 10%.

	New Loan From Outside			New Loan From Inside Bank		
	Old Regime	New Regime	Mean Differences	Old Regime	New Regime	Mean Differences
Loan Characteristics						
Collateral	30	40	10.0 ***	20	30	10.0 ***
Ln(Loan Amount)	4.3	4.5	0.2	4.5	4.3	-0.1 *
Interest Rate	19.1	13.9	-5.2 ***	19.5	15.6	-3.9 ***
Maturity	17.3	25.8	8.5 ***	11.5	14.9	3.4 ***
Number of Observations	596	496	1,092	1,118	1,257	2,375

TABLE 12

Loan Conditions of New Loans by *Outside Banks*, Granted to Firms with Records of Non Performing Loans

The Table reports OLS regressions for a sample of 1,034 new loans granted by *outside banks* to firms that had records of non-performing loans in the past. Columns I-VIII report specifications for each of the loan characteristics: Interest Rate, Collateral, Ln(loan amount) and Maturity. The models include the variable *New Regime* and firm and loan characteristics as controls. Bank Fixed Effects are included in all specifications. Definitions of the variables can be found in Table 2 and Table 4. Coefficients are listed in the first row, robust standard errors that are corrected for clustering at the firm level are reported in the row below in parentheses, and the corresponding significance levels are in the adjacent column. Note: *** Significant at 1%, ** significant at 5%, * significant at 10%.

Dependent Variable	Interest Rate		Collateral		Ln(Loan Amount)		Maturity	
Models	I	II	III	IV	V	VI	VII	VIII
New Regime	-4.20***	-3.58***	14.42***	6.47**	0.31**	-0.34***	8.28***	4.39***
	(0.54)	(0.46)	(3.40)	(2.80)	(0.13)	(0.12)	(1.59)	(1.46)
Constant	20.99***	27.54***	-35.69***	-20.09**	3.82***	6.63***	-11.05**	-15.34***
	(1.87)	(1.29)	(7.72)	(7.85)	(0.44)	(0.27)	(5.40)	(5.31)
Firm Characteristics	YES	YES	YES	YES	YES	YES	YES	YES
Loan Characteristics		YES		YES		YES		YES
Macroeconomic Characteristics	YES	YES	YES	YES	YES	YES	YES	YES
Industry Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES
Bank Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES
R-squared	0.18	0.34	0.13	0.30	0.19	0.38	0.10	0.29
Number of observations	1,034	1,034	1,034	1,034	1,034	1,034	1,034	1,034

TABLE 13

Loan Conditions of New Loans by *Inside Banks*, Granted to Firms with Records of Non Performing Loans

The Table reports OLS regressions for a sample of 2,215 new loans granted by inside *banks* to firms that had records of non performing loans in the past. Columns I-VIII report specifications for each of the loan characteristics: Interest Rate, Collateral, Ln(loan amount) and Maturity. The models include the variable *New Regime* and firm and loan characteristics as controls. Bank Fixed Effects are included in all specifications. Definitions of the variables can be found in Table 2 and Table 4. Coefficients are listed in the first row, robust standard errors that are corrected for clustering at the firm level are reported in the row below in parentheses, and the corresponding significance levels are in the adjacent column. Note: *** Significant at 1%, ** significant at 5%, * significant at 10%.

Dependent Variable	Interest Rate		Collateral		Ln(Loan Amount)		Maturity	
Models	I	II	III	IV	V	VI	VII	VIII
New Regime	-2.96***	-2.72***	6.12***	1.25	0.05	-0.37***	4.24***	2.81***
	(0.33)	(0.31)	(1.81)	(1.73)	(0.09)	(0.09)	(0.62)	(0.50)
Constant	19.73***	26.93***	-5.39	-4.04	3.95***	6.23***	1.68	-1.63
	(0.68)	(0.77)	(4.03)	(6.73)	(0.22)	(0.28)	(1.15)	(3.16)
Firm Characteristics	YES	YES	YES	YES	YES	YES	YES	YES
Loan Characteristics		YES		YES		YES		YES
Macroeconomic Characteristics	YES	YES	YES	YES	YES	YES	YES	YES
Industry Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES
Bank Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES
R-squared	0.16	0.37	0.07	0.22	0.25	0.45	0.06	0.24
Number of observations	2,215	2,215	2,215	2,215	2,215	2,215	2,215	2,215

TABLE 14

Loan Conditions of New Loans by Inside and Outside Banks

The Table reports OLS regressions for a sample of 451,462 new loans granted to 26,401 firms. Columns I-IV report specifications for each of the loan characteristics: Interest Rate, Collateral, Ln(loan amount) and Maturity. The models include an indicator variable for the *New Regime*, an indicator variable for *Good Firm*, which takes the value of one if the firm never default before time *t* and zero otherwise. An interaction term *New Regime* and *Good Firm* is also included. Firm, relationship, loan and macroeconomic characteristics are included as controls. Definitions of the variables can be found in Table 2 and Table 4. Coefficients are listed in the first row, robust standard errors that are corrected for clustering at the firm level are reported in the row below in parentheses, and the corresponding significance levels are in the adjacent column. Note: *** Significant at 1%, ** significant at 5%, * significant at 10%. In Column (I) firm and bank fixed effects are included. In Column (II) loan characteristics are added as controls. And Column (III) includes firm*bank fixed effects.

Dependent Variable	Spread Interest Rate			Collateral			Ln(Loan Amount)			Maturity		
Models	I	II	III	I	II	III	I	II	III	I	II	III
New Regime	0.41***	0.64***	1.72***	-2.44***	-5.63***	-3.82***	0.16***	-0.14***	-0.24***	1.68***	1.39***	0.42**
	(0.07)	(0.06)	(0.07)	(0.36)	(0.36)	-0.45	(0.02)	(0.02)	(0.02)	(0.16)	(0.16)	(0.19)
Good Firm x New Regime	-0.13*	-0.06	0.05	1.92***	2.15***	1.72***	0.02	0.06***	0.07***	0.30*	0.16	-0.21
	(0.08)	(0.07)	(0.08)	(0.39)	(0.38)	(0.45)	(0.02)	(0.02)	(0.02)	(0.18)	(0.17)	(0.19)
Good Firm	0.13*	0.26***	-0.17**	-1.40***	-1.62***	-2.04***	0.10***	0.07***	0.06***	-0.84***	-0.91***	-0.47***
	(0.07)	(0.06)	(0.07)	(0.33)	(0.33)	(0.40)	(0.02)	(0.02)	(0.02)	(0.16)	(0.15)	(0.17)
Firm and Relationship Characteristics												
ROA	-1.68***	-2.01***	-1.92***	0.88	0.53	-0.31	-0.20***	-0.37***	-0.44***	-1.49***	-1.39***	-1.33**
	(0.24)	(0.22)	(0.24)	(1.11)	(1.09)	(1.26)	(0.06)	(0.06)	(0.06)	(0.53)	(0.51)	(0.55)
Current Ratio	0.05***	0.01*	0.01*	-0.12***	-0.03	0.01	-0.02***	-0.02***	-0.02***	-0.01	0.04***	0.04**
	(0.01)	(0.00)	(0.01)	(0.03)	(0.03)	(0.03)	(0.00)	(0.00)	(0.00)	(0.02)	(0.02)	(0.02)
Liabilities/Equity	-0.02**	0.01	0.00	-0.01	-0.11**	-0.10*	0.02***	0.02***	0.01***	0.08***	0.04**	0.07***
	(0.01)	(0.01)	(0.01)	(0.05)	(0.05)	(0.06)	(0.00)	(0.00)	(0.00)	(0.02)	(0.02)	(0.02)
Small Firm	0.86***	0.33***	0.16**	-2.20***	-0.81**	-0.14	-0.30***	-0.23***	-0.20***	-0.75***	-0.07	0.33*
	(0.07)	(0.06)	(0.07)	(0.41)	(0.40)	(0.49)	(0.02)	(0.02)	(0.02)	(0.17)	(0.16)	(0.17)
Number of Relationships	-0.08***	-0.01	0.05***	-0.14***	-0.24***	-0.16**	0.05***	0.05***	0.06***	-0.09***	-0.15***	-0.15***
	(0.01)	(0.01)	(0.01)	(0.05)	(0.05)	(0.06)	(0.00)	(0.00)	(0.00)	(0.02)	(0.02)	(0.03)
Length of Relationship	-0.05***	0.01***	-0.07***	0.28***	0.19***	-0.00	0.03***	0.03***	0.03***	0.02***	-0.05***	0.07***
	(0.00)	(0.00)	(0.00)	(0.02)	(0.02)	(0.02)	(0.00)	(0.00)	(0.00)	(0.01)	(0.01)	(0.01)

TABLE 14 (continued)

Loan Conditions of New Loans by Inside and Outside Banks

Dependent Variable	Spread Interest Rate			Collateral			Ln(Loan Amount)			Maturity		
Models	I	II	III	I	II	III	I	II	III	I	II	III
Macroeconomic Characteristics												
GDP Growth	-0.22***	-0.17***	-0.08***	-0.27***	-0.42***	-0.31***	0.03***	0.03***	0.02***	0.23***	0.20***	0.11***
	(0.01)	(0.01)	(0.01)	(0.03)	(0.03)	(0.04)	(0.00)	(0.00)	(0.00)	(0.01)	(0.01)	(0.02)
Loan Characteristics												
Collateral		-1.71***	-2.03***					0.33***	0.43***		7.74***	6.79***
		(0.03)	(0.04)					(0.01)	(0.01)		(0.11)	(0.13)
Ln(Loan Amount)		-1.64***	-1.55***		2.43***	3.76***					1.58***	1.35***
		(0.01)	(0.02)		(0.08)	(0.12)					(0.03)	(0.04)
Interest Rate					-0.70***	-0.83***		-0.09***	-0.07***		-0.08***	-0.12***
					(0.01)	(0.02)		(0.00)	(0.00)		(0.01)	(0.01)
Time to Maturity		-0.01***	-0.02***		0.36***	0.39***		0.01***	0.01***			
		(0.00)	(0.00)		(0.01)	(0.01)		(0.00)	(0.00)			
Constant	17.87***	23.40***	19.27***	15.38**	20.32***	21.61***	3.16***	5.07***	5.10***	9.21**	4.78	4.76***
	(1.54)	(0.93)	(0.13)	(7.16)	(4.83)	(0.85)	(0.46)	(0.33)	(0.03)	(3.97)	(3.04)	(0.36)
Firm Fixed Effects	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO
Bank Fixed Effects	YES	YES	NO	YES	YES	NO	YES	YES	NO	YES	YES	NO
Firm x Bank Fixed Effects	NO	NO	YES	NO	NO	YES	NO	NO	YES	NO	NO	YES
R-squared	0.4	0.5	0.7	0.3	0.4	0.6	0.6	0.7	0.8	0.4	0.5	0.7
Number of observations	451,462	451,462	451,462	451,462	451,462	451,462	451,462	451,462	451,462	451,462	451,462	451,462

TABLE 15
Loan Conditions of New Loans by Inside and Outside Banks

The Table reports OLS regressions for a sample of 167,267 new loans granted to 10,933 firms that received a loan from at least one *inside* and one *outside* bank in the same quarter. Columns I-IV report specifications for each of the loan characteristics: Interest Rate, Collateral, Ln(loan amount) and Maturity. The models include the variable *Switch*, with is an indicator variable that takes the value of one if the loan was granted by an *outside bank* and zero otherwise and an interaction term with the *New Regime*. Some of the specifications also include loan characteristics as controls. Firm x Time Fixed Effects and Bank Fixed Effects are included in all specifications. Definitions of the variables can be found in Table 4. Coefficients are listed in the first row, robust standard errors that are corrected for clustering at the firm level are reported in the row below in parentheses, and the corresponding significance levels are in the adjacent column. Note: *** Significant at 1%, ** significant at 5%, * significant at 10%.

Dependent Variable	Spread Interest Rate		Collateral		Ln(Loan Amount)		Maturity	
Models	I	II	III	IV	V	VI	VII	VIII
Switch	-0.31***	-0.59***	-5.05***	-4.14***	-0.21***	-0.21***	-5.97***	-5.31***
	(0.05)	(0.05)	(0.29)	(0.28)	(0.01)	(0.01)	(0.22)	(0.22)
Switch x New Regime	0.19**	0.35***	-2.89***	-2.62***	0.13***	0.16***	-2.70***	-2.64***
	(0.09)	(0.08)	(0.54)	(0.53)	(0.02)	(0.02)	(0.43)	(0.42)
Loan Characteristics								
Interest Rate				-0.87***		-0.09***		0.44***
				(0.03)		(0.00)		(0.03)
Collateral		-1.70***				0.20***		7.89***
		(0.04)				(0.01)		(0.31)
Ln(Loan Amount)		-1.38***		1.63***				0.78***
		(0.02)		(0.12)				(0.10)
Maturity		0.01***		0.13***		0.00***		
		(0.00)		(0.01)		(0.00)		
Constant	14.65***	19.89***	20.86	32.05***	3.71***	5.50***	12.05	-1.86
	(1.96)	(1.08)	(15.38)	(11.73)	(0.64)	(0.46)	(9.76)	(8.96)
Firm x Time Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES
Bank Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES
R-squared	0.41	0.51	0.42	0.44	0.54	0.6	0.36	0.37
Number of observations	167,267	167,267	167,267	167,267	167,267	167,267	167,267	167,267